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Review of enterprise resource planning systems in United Nations organizations

Note by the Secretary-General

The Secretary-General has the honour to transmit to the members of the General Assembly the report of the Joint Inspection Unit entitled "Review of enterprise resource planning (ERP) systems in United Nations organizations".

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JIU/REP/2012/8

REVIEW OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS IN UNITED NATIONS ORGANIZATIONS

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Executive Summary

Review of enterprise resource planning (ERP) systems in United Nations organizations
JIU/REP/2012/8

The objective of this report is to review the implementation, use, maintenance, evolution, upgrade and extension of existing ERP systems in the United Nations organizations, and establish success factors for enhancing their sustainability and flexibility to evolving user requirements and technology. The review aims to help organizations improve their ERP systems as well as their benefits; identify system-wide opportunities to share, harmonize and standardize ERP operations between the organizations; share services or merge components of systems in order to maximize synergies across the system; and strengthen the position of the United Nations organizations in their relations with ERP providers. In doing so, the report assesses the efficiency, effectiveness, value added, impact, user satisfaction, coherence and sustainability of ERP systems.

The findings, conclusions and recommendations of the present review build on previous related Joint Inspection Unit (JIU) reports, as well as on current and previous studies on the implementation of ERP systems in the United Nations structure.

Main findings and conclusions

Implementing an ERP system is a journey that requires strong project management techniques and entails direct and indirect costs throughout the life cycle stages of the system. The Inspectors found that most organizations' ERP systems were implemented over budget and over schedule, as a result of weak project planning and management, including: inadequate definition of functional requirements; unrealistic budget and schedule; changes in the project's scope; delay in data conversion and business process re-engineering; users' resistance to change; and unforeseen customization costs. The Inspectors concluded that organizations need to better follow success factors identified in this report, share lessons learned within the system and enhance inter-agency collaboration for ERP support to achieve more cost-efficient ERP implementation, maintenance and growth.

The Inspectors realized that most United Nations organizations initially opted for a highly customized ERP, as managers were reluctant to redesign business processes. At the time of the upgrade, they would reimplement or upgrade the system in a less customized manner, due to the high costs associated with the maintenance and upgrade of customized systems, and to users' learning curve, which permitted better user acceptance of a less customized system. The Inspectors also found that high customization of ERP systems had a negative impact on ERP systems' usability and accessibility. The Inspectors concluded that organizations should effectively re-engineer their business processes and limit ERP customizations, taking the opportunity of upgrades to revisit business processes.

Regarding costs, the Inspectors noticed that each organization measured ERP costs differently, making it very difficult to assess the total cost of ownership of ERP systems. Indirect costs tended to be omitted from ERP projects' budget, as well as the projection of maintenance and upgrade costs, despite the fact that they constitute the biggest cost proportion in an ERP system's life cycle and that there is a direct causal relationship between the initial customizations made to such a system and its future maintenance and upgrade costs. The Inspectors concluded that to ensure effective governance of ERP projects, organizations should define a realistic cost plan, including the ERP total cost of ownership elements as well as contingencies. Adequate funding should be provided accordingly throughout the project life.

The Inspectors also found that most organizations do not measure quantitatively ERP benefits and cost savings or cost avoidance, although many reported that ERP allowed the streamlining and harmonization of business processes across organizations' duty stations, as well as efficiency gains and improved information management and reporting. ERP also enhanced internal controls and the availability of timely and consolidated financial data, notably supporting the strengthening of financial controls. The Inspectors concluded that since ERP projects represent major investments for the organizations, they require close monitoring and reporting mechanisms on the progress of implementation and achievement of expected benefits.

The Inspectors observed that the extent to which ERP systems had a positive impact on organizations in which they were implemented depended on the implementation approach, change management and training strategy that had been implemented; users' learning curve; data governance; internal controls that had been built into the system; users' accessibility to the system; and organizations' capacity to collect and review users' feedback once the system had been implemented.

The Inspectors found that ERP projects were impinged by a lack of appropriate training of managers, key ERP staff and end users before and after ERP implementation. Lack of training resulted in managers' and users' resistance to change, data inaccuracy and reporting and internal control issues. The Inspectors concluded that adequate training on the benefits and functionalities of ERP should be provided to existing and future managers, key ERP staff and end users throughout the ERP life cycle, and that appropriate resources should be allocated to training on an ongoing basis. Moreover, the Inspectors realized that the lack of internal controls in the system also resulted from the lack of ongoing feedback mechanisms following ERP implementation. The Inspectors concluded that organizations should constantly monitor users' feedback and strengthen the internal oversight of ERP systems, to identify and address arising issues and risks. Also, to mitigate internal controls risks, staff roles and responsibilities should be redefined in accordance with ERP business processes, and managers should be held fully accountable for electronic approvals made in the system.

Regarding coherence, the Inspectors noticed that although there is no coherent United Nations strategy regarding ERP implementations, ERP has led to a certain degree of harmonization of business processes across the United Nations system, due to a number of factors, including: the implementation of more "vanilla" (uncustomized) ERP systems over time; the convergence of functionalities offered by ERP providers; the possibility of integrating different systems; the sharing of ERP systems among some of the organizations; and International Public Sector Accounting Standards (IPSAS) implementation. The Inspectors found that the fact that organizations have different rules and regulations, charts of accounts and reporting practices was one of the main issues preventing greater ERP coherence. The Inspectors concluded that the Secretary-General, in his capacity as Chairperson of the United Nations System Chief Executives Board for Coordination (CEB), should speed up the efforts of the High-level Committee on Management (HLCM) to harmonize business processes across the United Nations system, with a view to enhancing organizations' efficiency and effectiveness. As technology evolves and the ERP systems implemented gain more maturity in use, it will be possible in the future to use one ERP, as illustrated by Procter and Gamble's ERP experience.

Moreover, the Inspectors observed that in the ERP market, suppliers have a disproportionate amount of negotiating power relative to customers, and that the CEB HLCM should establish a task force to review system-wide opportunities for ERP collaboration, and better position United Nations system organizations vis-à-vis ERP providers.

The report contains four recommendations: one addressed to the Secretary-General as head of the CEB, one for the consideration of legislative/governing bodies and two addressed to executive heads of United Nations system organizations.

Recommendation for consideration by legislative and governing bodies

Recommendation 2

The legislative/governing bodies of United Nations system organizations should exercise their monitoring and oversight role on their respective ERP projects on an ongoing basis, including implementation, maintenance and growth policy, cost-efficiency and achievements of the overall objectives of the projects.

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Abbreviations

ACABQ	Advisory Committee on Administrative and Budgetary Questions
CABIO	Oracle's Customer Advisory Board for International Organizations
CEB	United Nations System Chief Executives Board for Coordination
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DFS	Department of Field Support
ERM	enterprise risk management
ERP	enterprise resource planning
FAO	Food and Agriculture Organization of the United Nations
HLCM	High-level Committee on Management
IAEA	International Atomic Energy Agency
ICAO	International Civil Aviation Organization
ICC	International Computing Centre
ICT	information and communication technology
ILO	International Labour Organization
IMF	International Monetary Fund
IMIS	Integrated Management Information System
IMO	International Maritime Organization
IPSAS	International Public Sector Accounting Standards
IT	information technology
ITU	International Telecommunication Union
JIU	Joint Inspection Unit
MoU	memorandum of understanding
OCHA	Office for the Coordination of Humanitarian Affairs
RBB	results-based budgeting
RBM	results-based management
SaaS	software as a service
SAP-SIG	SAP Special Interest Group
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNCDF	United Nations Capital Development Fund

UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UN-Habitat	United Nations Human Settlements Programme
UNHCR	Office of the United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNJSPF	United Nations Staff Joint Pension Fund
UNOPS	United Nations Office for Project Services
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UNU	United Nations University
UN-Women	United Nations Entity for Gender Equality and the Empowerment of Women
UNWTO	United Nations World Tourism Organization
UPU	Universal Postal Union
WFP	World Food Programme
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization

I. Introduction

A. Background

1. As part of its programme of work for 2012, the JIU conducted a review entitled "Review of enterprise resource planning (ERP) systems in United Nations organizations". This review builds on previous related JIU reports, as well as on current and previous studies on the implementation of ERP systems in the United Nations system.

2. In general, ERP systems provide standard applications to manage the financial, human and physical resources of a user organization, integrating data and business processes under a unified information system sharing a common set of data. ERP systems are composed of modules by functional area, such as finance and accounting, human resources management and supply chain management that can be implemented in stages. The modular design also allows the implementation of selected functions only. They are also designed to include modifiable parameters that can, to some extent, be configured to reflect the specificities and workflows of organizations. Configuration options include settings such as the definition of the chart of accounts and fiscal periods, as well as parameters that drive business processes.

3. Most United Nations organizations have invested in ERP systems to replace legacy systems, for cost containment reasons and to improve operational performance, efficiency and internal controls. Considering the available industry-wide solutions and their benefits, particularly when compared to other means of processing structured organizational data, ERP systems have the ability to automate and integrate business processes, share common data and practices across an organization, and produce and access real-time information.

4. These systems offer organizations the opportunity to adopt good practices and have the potential to enhance operational efficiency, accountability and organizational performance. They provide a platform that facilitates organizations' adoption of new technology. Moreover, the ability to access ERP systems and their centralized, integrated databases through web browsers facilitates the outsourcing/offshoring of support services/functions, as well as the development of centralized shared service centres for the provision of those services/functions.

5. ERP systems are considerably complex. Their implementation is often lengthy, cumbersome and costly, involving considerable organizational change and numerous stakeholders, including information technology personnel and representatives of service provider and user departments, as well as external consultants and system integrators — i.e. implementation partners. Such projects require an experienced project implementation team as well as effective project management, change management, governance and risk management mechanisms.

6. Organizations investing in ERP systems increasingly recognize the importance of improving the methods for evaluating the outcome of ERP implementation in terms of improved efficiency, effectiveness and organizational performance by establishing at the outset of the project clear, agreed goals and objectives for the project and a fully developed business case for the ERP implementation, along with the measures for determining success. These projects should be delivered on time,

within budget and with the expected functionalities, weighing the necessary trade-offs.

(a) Related General Assembly resolutions and ACABQ reports

7. In its reports on progress in the implementation of the United Nations ERP project (Umoja), the Advisory Committee on Administrative and Budgetary Questions (ACABQ) has consistently called for increased collaboration between the United Nations Secretariat and other United Nations system organizations. This collaboration could be viewed as a long-term option for lowering ERP costs in the future. The Secretary-General is mandated to pay particular attention to maximizing exchanges and synergies between the organizations regarding their respective ongoing ERP initiatives, and to examine the feasibility of convergence towards the adoption of common ERP solutions among the entities of the United Nations system in the long term (see A/65/576, para. 40, and A/66/7/Add.1, paras. 41-43. Those recommendations were endorsed by the General Assembly in its resolutions 65/259 and 66/246).

(b) Related JIU reports and key issues raised

8. This is the first system-wide ERP review carried out by the JIU. Nevertheless, over the past years, the JIU has conducted a number of reviews on issues related to the implementation of ERP systems across the United Nations system organizations and/or their role in the delivery of administrative services. The JIU Inspectors, in related reports,[1] have long held the view that the organizations of the United Nations system could greatly benefit from increased cooperation in the delivery of information systems and administrative services, both in terms of increased savings and efficiency gains as well as increased effectiveness. They have consistently encouraged such cooperation, highlighting the need to share experiences among organizations; to standardize, simplify and harmonize business practices; to share common information and communication technology (ICT) and business solutions and strategies wherever possible; and to avoid costly duplications.

B. Objectives and scope

9. The objective of this report is to review the implementation, use, maintenance, evolution, upgrade and extension of existing ERP systems in the United Nations system organizations, and establish success factors for enhancing their sustainability and flexibility to evolving user requirements and technology. The review aims to help organizations improve their ERP systems as well as their benefits, and identify system-wide opportunities to share, harmonize and standardize ERP operations between the organizations, share services or merge components of systems in order to maximize synergies across the system, and strengthen the position of the United Nations organizations in their relations with ERP providers. In doing so, the review assesses the efficiency, effectiveness, value added, impact, user satisfaction, coherence and sustainability of ERP systems in the United Nations system.

[1] Previous ERP-related JIU reports include the reports on a common payroll system; ICT governance; ICT hosting services; offshore service centres; IPSAS preparedness; accountability frameworks; travel arrangements; and the Medical Service. Relevant parts of these reports are summarized in Annex 1, available at www.unjiu.org.

10. The scope of the review is system-wide, covering ERP implementation in all JIU participating organizations until mid-2012.

C. Methodology

11. In accordance with the internal standards and guidelines of the JIU and its internal working procedures, the methodology followed in preparing this report included a preliminary desk review, questionnaires, interviews and an in-depth analysis. A detailed questionnaire was sent to all participating organizations, and an online survey was also sent to the participants in the 2012 joint meeting of Oracle's Customer Advisory Board for International Organizations (CABIO) and the SAP Special Interest Group (SAP-SIG).[2] On the basis of the responses received, the Inspectors conducted interviews with officials of the participating organizations and also sought the views of other international organizations, including the International Monetary Fund (IMF) and the World Bank, and Procter and Gamble in the private sector.[3]

12. The JIU was also given access to the survey responses collected in the framework of the Umoja study on the implementation and ownership of ERP systems by United Nations organizations,[4] which were also used for the drafting of this report. Moreover, the Inspectors conducted focus groups with users from a sampling of organizations, selected according to the following criteria: Oracle and SAP users; select field-driven and headquarters-based organizations; and organizations with a small and large workforce. The findings from users' focus groups are summarized in annex V.

13. Comments from participating organizations on the draft report have been sought and taken into account in finalizing the report. In accordance with article 11.2 of the Statute of the Joint Inspection Unit, this report was finalized after consultation among the Inspectors so as to test its conclusions and recommendations against the collective wisdom of the JIU. To facilitate the handling of the report and the implementation of its recommendations and the monitoring thereof, annex VI contains a table indicating whether the report is submitted to the organizations concerned for action or for information. The table identifies those recommendations relevant for each organization, specifying whether they require a decision by the organization's legislative or governing body or can be acted upon by the organization's executive head.

14. The Inspectors wish to express their appreciation to all who assisted them in the preparation of this report, and particularly to those who participated in the interviews and so willingly shared their knowledge and expertise.

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[2] The joint CABIO/SAP-SIG meeting included over 100 participants — mainly IT (information technology) representatives from international organizations and sales representatives from Oracle and SAP. More details about the methodology are available at www.unjiu.org.

[3] With about 120,000 employees, 300 brands sold in 180 countries and operations in different regions in all continents, Procter and Gamble provided some similarities with the United Nations system, in terms of scale and complexity. See http://www.pg.com/en_US/downloads/company/PG_GBS_Factsheet.pdf.

[4] The full results of the Umoja survey are available on the JIU website.

II. Implementation and maintenance

A. Overview

15. Among the JIU participating organizations reviewed, 13 are using Oracle and/or PeopleSoft,[5] seven are using SAP and one is using Agresso. The International Telecommunication Union (ITU), which took the lead in finding a more sustainable and cost-efficient system, concluded that ERP was the best solution for its needs. At that time, the United Nations system organizations had not come up with a common ERP or customized solution.

16. Other organizations followed ITU, and a wave of ERP implementations started in the 1990s, with the Food and Agriculture Organization of the United Nations (FAO), the United Nations High Commissioner for Refugees (UNHCR), the United Nations Children's Fund (UNICEF) and the World Food Programme (WFP). However, United Nations system organizations are at different stages of ERP implementation and some organizations are still without an ERP system.[6] The way the same software is configured for each ERP instance varies according to each organization's specific business needs and practices.

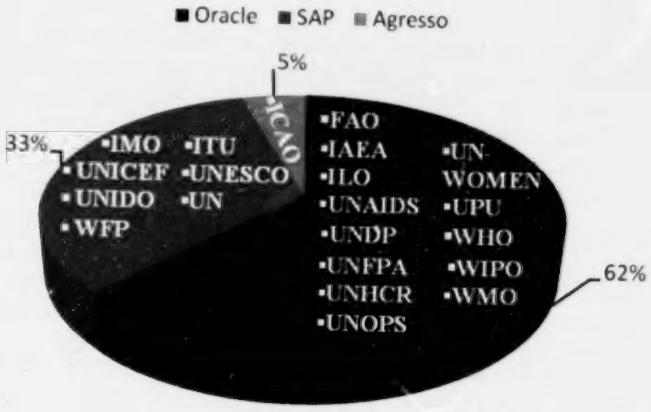
17. It is important to note that the International Civil Aviation Organization (ICAO) is the only organization using Agresso and that the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) are currently working with WFP on the ERP design phase for an SAP-based solution. The United Nations World Tourism Organization (UNWTO) will study the possibility of introducing an ERP or another integrated system after implementing the IPSAS. Figure 1 shows the use of ERP by organizations.[7]

[5] Oracle includes Oracle Financials, PeopleSoft and Oracle E-Business Suite.

[6] See Annex II.

[7] According to JIU questionnaires, almost 40,000 direct users are currently using Oracle, about 16,000 SAP, and less than 1,000 Agresso. With the implementation of Umoja, there will be about 25,000 direct SAP users in the United Nations system.

Figure I
ERP systems implemented across the United Nations system[8]



18. Over time, the functionalities offered by Oracle and SAP are becoming more similar, and new technologies make it possible to interface different ERP systems. However, the benefits of ERP systems can only be fully maximized if all the core business processes are run on the same instance, using a single database, and if they are only interfaced with external systems for very specific business processes. A general problem noted with ERP implementations is that not all of the business processes are handled inside the same system. Some organizations use both Oracle and SAP systems,[9] due to the fact that in the early days of ERP, PeopleSoft — now Oracle — was better suited for human resources, and SAP for accounting and finance. Since this is no longer true, it would be expected that in the long term, these organizations will run all their business processes in the same ERP.

19. In very few cases, it is simpler and better to acquire specialized software rather than customizing the ERP to meet very specific requirements, due to the nature of the business. For example, the United Nations Department of Field Support (DFS) Air Transport Section is in the process of acquiring specialized software — ATMS — to deal with aircraft management, because it cannot be handled in the ERP.

B. Costs

20. Implementing an ERP is a journey that entails direct and indirect costs throughout the life cycle stages of the system. The total cost of ownership of an ERP consists of software and hardware acquisition costs, implementation costs associated with the deployment and roll-out of the system, operation costs pertaining to the maintenance of the system once it has been deployed, and ongoing change and

[8] The United Nations ERP (Umoja) is included in SAP since it will be its core system. UNDP, UNFPA, UNOPS and UN-Women are using the same ERP system. WHO and UNAIDS are using the same ERP system.

[9] As an example, the United Nations Secretariat, which will be using SAP as its core system, is using Oracle for human resources (Inspira).

growth costs regarding the upgrade of the system and addition of new functionalities. It also includes associated or hidden costs, such as data cleansing; documentation update; migration, validation and reconciliation of data; interfaces development between legacy information systems and the ERP; user testing; deployment management; ongoing training costs; and a loss of staff productivity following the implementation of the system, which are mainly borne by ERP business owners.

21. The CEB ICT Network is currently trying to develop a common assessment approach of the total cost of ownership of ICT activities, a project that started in early 2011 and is expected to be finished by early 2013. However, it only focuses on ICT costs as a whole, and does not individually address the total cost of ownership components of ERP systems. FAO is trying to identify technical components of the total cost of ownership of its ERP (see box 1).[10] Nevertheless, at the time the review was conducted, each organization measured ERP costs differently, making it very difficult to assess the total cost of ownership of ERPs implemented in the United Nations system. **In the opinion of the Inspectors, the CEB ICT Network project should be expanded to develop a common methodology for assessing the total cost of ownership of ERP systems.**

Box 1

Technical components of ERP total cost of ownership identified by FAO

- ✓ *Hardware acquisition, maintenance and ongoing change/growth costs, pre- and post-implementation;*
- ✓ *Software acquisition and maintenance costs, pre- and post-implementation;*
- ✓ *Personnel costs for the ERP implementation, maintenance and ongoing change/growth, pre- and post-implementation;*
- ✓ *Network and communications acquisition costs, and maintenance and ongoing change/growth costs post-implementation;*
- ✓ *Facilities and other acquisition costs.*

22. Based on the information provided by the organizations, the cost of ERP implementations in the United Nations system amounted to at least **US$ 712 million**. This figure does not include annual recurring maintenance costs, which amount to at least **US$ 66 million** per year.[11] It also excludes associated costs, which tend to be omitted from ERP budgets,[12] leading to a lack of transparency of the actual implementation costs and preventing the governing bodies of the projects from

[10] At the time of the JIU review, the data available was still being assessed.

[11] See their breakdown per organization in Annex IV.

[12] As an illustration, the United Nations Board of Auditors estimated that Umoja's currently unbudgeted associated costs "could total between **$86 million** and **$110 million**", excluding human resources, which is still handled in Inspira. See the First annual progress report of the Board of Auditors on the implementation of the United Nations enterprise resource planning system (A/67/164), paragraph 69.

taking timely and informed decisions to mitigate risks, including the risk of a lack of funding.

23. In this regard, the Inspectors would like to recall the JIU report on ICT governance, which highlights that "effective ICT governance at the corporate level cannot be achieved without a clear picture of the total ICT costs incurred by the organization".[13] **In order to secure adequate funding, organizations should define a realistic cost plan, which includes the ERP total cost of ownership as well as contingencies. The legislative/governing bodies should provide adequate funding of ERP projects' requirements, on the basis of that cost plan.**

24. For the acquisition and implementation of ERP systems, organizations reviewed would normally have a project budget, which could include software licences, hosting, hardware and infrastructure, external consulting, project staff costs, support costs and initial training costs. Regarding licences, each organization pays a very different price for similar software licences. ERP licence costs vary depending on the geographic region and the time of the implementation, early ERP adopters benefiting from higher discounts than late adopters. The licence pricing models are very complex, and may involve costs by central processing unit (CPU)[14] and/or by users. Depending on the agreement concluded with the ERP vendor, additional licence costs may be incurred for each ERP testing instance.

25. The projection of maintenance and upgrade costs for an ERP tends to be missing from the ERP implementation projects' budgets, despite the fact that they constitute the biggest cost proportion in an ERP life cycle, and that there is a direct causal relationship between the initial customizations made to an ERP and the future maintenance and upgrade costs of the system. In the Inspectors' view, **it is important that in ERP implementation budgets, organizations provide clearly defined future ERP maintenance and upgrade costs, including cost implication forecasts of the proposed software customizations.**

26. Once ERP systems have been implemented, the costs associated with the licence maintenance and ongoing support costs tend to be included in the organizations' overall ICT budget. However, estimates of ERP costs outside of ICT are hard to determine. For example, in WFP, ERP support costs are budgeted separately in the ICT division; however, such costs are not budgeted separately in the business units, since the ERP is part of the business activities.

27. ERP providers push for the upgrade of ERP systems, releasing new versions of the software every four to five years that provide new functionalities, modules and bug fixes (see annex II), and ceasing to support old versions of the software shortly after a new version has been released. ERP upgrades imply significant costs for the organization. The more an ERP system's core code is customized, the greater the cost of its upgrade, since at each upgrade the customizations have to be made again. It is possible, however, to reduce the costs derived from customization by adding

[13] JIU, ICT governance in the United Nations system organizations (JIU/REP/2011/9), para. 99.

[14] The CPU is the hardware within a computer system which carries out the instructions of a computer programme by performing the basic operations of the system. Some licensing models make organizations pay a licence per processor running the ERP software.

home-grown "bolt-ons"/add-on modules within the ERP, rather than making the customization in the system's core code.[15]

28. Planning for the recurring upgrade costs appeared to be problematic for organizations, especially due to the annual or biennial nature of the United Nations organizations' budget, which does not allow for the necessary multi-year planning of ERP projects. To address this issue, UNDP is currently looking at the possibility of having an ICT money reserve where funds would be saved in view of future upgrades.

29. In the opinion of the Inspectors, **the executive heads of the United Nations system organizations should calculate and report regularly to their legislative/ governing bodies on ERP costs throughout the projects' life cycles**.

C. Efficiency

30. ERP projects are often wrongly seen as ICT projects; however, they are major business transformation projects which imply a culture change in the way things are done in an organization. They require strong forward planning, management and governance, and users' buy-in to be implemented successfully and bring about the intended benefits for the organization.

31. The Inspectors found that that 67 per cent of ERP systems were implemented over schedule and 33 were over budget.[16] The most common reasons for a slipping timeline included: changes in the project's scope; delay in software customization; users' resistance to change; inadequate initial timeline; delay in data conversion; change in the project's original strategy; and delay in business process re-engineering. ERPs were implemented over budget mainly due to: unforeseen customization costs; inadequate definition of functional requirements; unexpected delays in the implementation; and unrealistic estimation of costs (see annex III).

(a) Project planning and software selection

32. During the review, the Inspectors observed that the main reasons for ERP implementation failures are: inadequate project and budget planning; including unrealistic planned timeline; changing project scope; inadequate definition of functional requirements; inadequate project staffing; and poor project management arrangements. Since ERP systems are about business and not ICT, it is important that business owners, including senior managers and users, are involved in the project from its outset. In the Inspectors' view, the responsibilities of business owners in ERP implementation and maintenance, and their associated costs, should be clearly defined from the inception of the project, and the necessary human and financial resources should be allocated accordingly throughout the project life. Planning should also forecast the decommissioning of legacy systems and their associated costs.

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[15] Options for ERP customization include rewriting part of the core code, writing a home-grown bolt-on/add-on module within the ERP system or interfacing to an external system. See the JIU website (http://www.unjiu.org) for a further discussion of the difference between ERP configuration and ERP customization.

[16] Source: results from the survey of the participants in the CABIO/SAP-SIG joint meeting. The survey was completed by representatives from 19 organizations.

33. Planning for the project timeline and scope involves defining the implementation strategy of the project. Options include using a "big bang" approach (i.e. a one-time deployment in all locations), a phased approach or a "pilot first" approach.[17] A phased approach strategy can divide the implementation in stages by functionality, geographical location and/or type of office — i.e. headquarters, regional offices and country offices. Among the organizations reviewed, 36 per cent adopted a big bang approach, 23 per cent adopted a phased approach by functionality and 23 per cent adopted a phased approach by geographical location and/or type of office.[18]

34. In general, implementing ERP with a big bang approach is much riskier than implementation using a phased approach. It therefore requires very strong risk management, viable communication and change management strategies. Moreover, the risks associated with a big bang approach tend to increase with the size and complexity of an organization. On the other hand, a big bang approach has the potential of streamlining all the business processes of an organization at once and of cutting the costs associated with the maintenance of legacy systems, provided that these are decommissioned when the ERP is implemented.

35. According to the Secretary-General's Fourth progress report on the enterprise resource planning project (A/67/360), Umoja is expected to replace 700 legacy systems and to interface with 300 systems.[19] Since core business processes, including human resources, finance, procurement, inventory management and central support services, are expected to be run in an ERP, it is important to include the decommissioning of the main legacy systems running these processes, such as IMIS (the Integrated Management Information System), Galileo and Mercury, in Umoja's project implementation plan and timeline. The 2012 ACABQ report on ERP further "underlines the need for the timely decommissioning of the systems that are to be replaced by [ERP] in order to avoid unnecessary costs [and] recommends that details of the systems to be decommissioned, including information on the related post and non-post resources be provided in the next progress report".[20]

36. For large organizations, using a phased approach for ERP implementation is usually the best solution, if it involves adequate planning of the entire project, including the integration of all business processes under a unified information system and the decommissioning of legacy systems to avoid duplication of costs. In the Inspectors' view, legislative/governing bodies should keep top managers accountable for the achievement of the ERP project deliverables, within the planned timeline and budget. Since ERP projects are major undertakings, the costs, benefits and risks associated with the planned ERP implementation approach have to be carefully assessed during the design phase of the project.

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[17] With a big bang approach, users have to switch from legacy systems to the ERP on one single date, from which legacy systems will not be used anymore. With a phased approach, the ERP is implemented in phases, defined by functionality, geographical location and/or type of office. With a pilot first approach, the ERP is introduced in some locations or departments first, and extended to other locations or departments over time if the pilot yields satisfactory results.

[18] Source: results from the survey of the participants in the CABIO/SAP-SIG joint meeting.

[19] Fourth progress report on the enterprise resource planning project: Report of the Secretary-General (A/67/360), para. 76.

[20] Enterprise resource planning project: Report of the Advisory Committee on Administrative and Budgetary Questions (A/67/565), para. 77.

37. The linkages and interdependencies of ERP projects with other major business transformation projects — such as IPSAS, decentralization or offshoring initiatives — that may be going on simultaneously within the organization should be clearly defined, including associated risks and contingencies, to ensure full consistency and harmonization of activities, and the availability of appropriate levels of human and financial resources. Generally, these projects put pressure on the same officials in organizations; therefore, poor planning and coordination between major business transformations projects may lead to the failure of all or part of these projects.

38. As an example, the linkages and interdependencies between IPSAS and ERP projects should be clearly defined. UNICEF decided to implement its ERP globally and IPSAS at the same time, to avoid the data conversion problems that would occur if they implemented IPSAS with legacy systems and to avoid the cost of modifying a dead-end custom-made system for a new accounting standard.[21] On the other hand, UNWTO decided to implement IPSAS first, before considering whether to implement an ERP, due to its limited resources. The United Nations was expected to implement the first phase of its ERP (Umoja Foundation) and IPSAS at the same time. However, due to Umoja's delay, IPSAS will now be first implemented with legacy systems and manual workarounds.[22] Moreover, some organizations had customized their ERP so much that they had to reimplement it or to undo customizations to become IPSAS compliant. For instance, WFP, which first implemented a very customized ERP (WINGS I) in 2001, had to reimplement it (WINGS II) in 2007/2008 to achieve IPSAS compliance and greater cost-efficiency.

39. Among the organizations reviewed, 78 per cent of the organizations selected the ERP software through a competitive bidding process.[23] In selecting the software, it is very important to ensure that it fits best the organizations' business processes and requirements. All user requirements and functional specifications should be carefully defined prior to the initiation of the software procurement process, and included in the request for proposal. ERP software should be selected following a careful fit-gap analysis of its processes with the organizations' business processes, and the assessment of the cost implications, throughout the life cycle of the ERP, the customizations, third party and/or legacy systems and system integrators that may be required.

(b) Implementation approach and business process re-engineering

40. ERP systems were built incorporating good practices and should therefore theoretically be deployed "as is". Standard ERP systems offer configuration options allowing organizations to add some of their business rules, which can survive the systems' upgrades. However, even if the systems have been configured, there are always some gaps left between the ERP systems' processes and an organization's business processes. Organizations are left with three options:

(a) Option 1: adopt an ERP without customization ("vanilla") and re-engineer their business processes accordingly;

(b) Option 2: customize the ERP to fit the organization's business processes;

[21] The UNICEF IPSAS-compliant ERP system based on SAP has gone live in more than 134 countries and 390 offices.

[22] A workaround is a temporary solution to bypass a recognized problem in a system.

[23] Source: Umoja survey.

(c) Option 3: adopt a mixed approach and carry out limited customizations to the system.

41. In some cases, organizations use a mixed approach and only make limited customizations to the system (see table 1). Organizations with a mixed approach can, for instance, adopt standard processes for non-core activities and have specific processes for the organization's core business. Each option presents benefits and disadvantages which should carefully be weighed by organizations when they define their ERP implementation approach.

Table 1
Strengths, weaknesses, opportunities and threats analysis of each option

Options	1. Adopt "vanilla" ERP	2. Fully customize the ERP according to the organization's business processes	3. Adopt a mixed approach and only make limited customizations to the system
Strengths	- Makes ERP implementation, maintenance and upgrade easier, cheaper and faster; - Streamlines standard good practices in the organization's way of doing business.	- Makes user acceptance of the system easier to achieve.	- Limits the costs of customization and makes the system easier to upgrade than a fully customized system; - Allows the system to be tailored to an organization's critical needs; - Customization through add-on modules may survive the upgrade, although it requires retesting.
Weaknesses	- Implies the need for more user preparation and training on the system; - The system is not tailored to the organization's specific needs.	- Implies very high implementation, maintenance and upgrade costs, as well as higher testing costs; - Implies high support costs and heavy dependence on specialized internal knowledge.	- Implies higher implementation, maintenance and upgrade costs than a "vanilla" ERP implementation.
Opportunities	- The ERP system can easily be upgraded, and can take full advantage of new technological innovations; - The ERP vendor is responsible for the performance of the system, if issues arise.		- The use of third party systems for very specific processes (e.g. aircraft management) can provide more extensive functionalities for organization's core business.

Options	1. Adopt "vanilla" ERP	2. Fully customize the ERP according to the organization's business processes	3. Adopt a mixed approach and only make limited customizations to the system
Risks/Threats	- Higher risk of user resistance to the system, if they have not been well prepared and involved in business processes reengineering; - Especially for small organizations, there are risks of staff loss of productivity, as the ERP system may make some business processes longer and more complicated than the original business processes.	- Customization increases the risks of implementation timeline and budget slippage; - If the core code of the ERP system has been customized, it may prevent organizations from upgrading their system and from taking advantage of new functionalities as technology evolves (see the examples of the World Bank and the IMF in Box 2); - The effect of customization on the system is not predictable. It may create bugs, which will not be the responsibility of the vendor; - Staff with specialized internal knowledge of the system's customization may be hard and costly to retain; - The over-customization of ERP may undermine the system's benefits.	- Bolt-ons/home-grown modules create risks of bugs in the system; - The use of third party or legacy systems increases the risks of data inaccuracy as data from these systems may not be transferred to the ERP system on a real-time basis (e.g. it may only be transferred at night). Moreover, manual data transfer increases the risks of data inaccuracy.

42. Most United Nations organizations reviewed that had implemented ERP ended up adopting a mixed approach, as a result of a twofold strategy. At first, they would opt for a highly customized ERP. Then, when it was time to upgrade, they would reimplement or upgrade the system in a less customized manner, due to the high costs associated with the maintenance and upgrade of customized systems, and to users' learning curve.

43. The experiences from the IMF and the World Bank summarized in Box 2 provide a good illustration of the risks associated with heavy ERP software customization. In view of the impact of customization on the system's total cost of ownership and functionalities, it is necessary that senior managers carefully assess the cost-efficiency of the planned ERP implementation approach and proposed customizations.

Box 2

The experience from the IMF and the World Bank with customized ERP modules

The IMF and the World Bank implemented highly customized versions of PeopleSoft's human resources module, since at that time the software was missing basic functionalities, and managers were not ready to change business processes. The systems were so customized that later

it was too expensive to remove the customizations and upgrade the modules.

Reimplementation of the modules is the only way to be able to upgrade them with new functionalities. The World Bank therefore started reimplementing its human resources module, with a view to have it be as "vanilla" as possible, taking into account the organization's policies, mandates and legal requirements. Having learned from its experience, it developed a good workplan for the reimplementation. The new module is expected to be implemented in 2013, with 59 per cent customization instead of 80 per cent.

At this point, the risks of not upgrading the ERP are considered low by the IMF, since it is self-sufficient in maintaining its code base, and can continue to do so for as long as Oracle continues to support People Tools. Therefore, the IMF has not reimplemented its human resources module yet, although it plans to remedy that problem. As an alternative, in order to implement new functionalities, it uses software-as-a-service (SaaS) modules — i.e. cloud-based human resources self-service modules — that are integrated with PeopleSoft's human resources module.

44. The Inspectors found that there are unnecessary customizations of ERPs due to the failure of managers to redesign business processes. This was mainly due to managers' lack of awareness of the benefits of ERPs, resistance to change, the lack of good governance structure and clear lines of authority and responsibility, and the difficulty and complexity of changing some of the business processes.

45. It is of the opinion of the Inspectors that **the executive heads of the United Nations system organizations should prepare a comprehensive project plan at the design stage, with all aspects of the project, with the view to re-engineering business processes effectively and keeping customizations minimal.**

(c) Project governance

46. In terms of governance, 91 per cent of the organizations reviewed established a steering committee specifically for the ERP and 83 per cent appointed a full-time director/manager responsible for the project. The ERP was managed as a separate corporate initiative in 57 per cent of the organizations, and was integrated with other corporate initiatives in 22 per cent of the cases.[24] Whether the ERP project is integrated with other corporate initiatives or is treated as separate, it should be led by a clear governance structure, entrusted with necessary decision-making responsibilities and with clear accountability lines.

47. Since ERP implementations imply corporate culture change, they require cross-functional decisions by top management. Therefore, ERP projects should be owned at the highest level of organizations and require the full engagement, commitment and leadership from senior managers in all business areas involved throughout the implementation of the project.

[24] Source: Umoja survey.

48. The Secretary-General of ITU took the lead in all decisions pertaining to the last ITU upgrade, and the Deputy Executive Directors of UNICEF and WFP chaired the steering committees governing ERP projects to ensure that those projects were completed on time and within budget.

Box 3

Success factors for ERP project governance

Set up a clear governance structure, including:

- ✓ *A top manager with full authority and accountability for the project — such as the Executive Director, the Deputy Executive Director for Operations of the organization or his/her equivalent — to ensure timely and effective cross-organizational decision-making throughout the implementation process;*
- ✓ *A high-level steering committee or equivalent chaired by a top manager of the organization, composed of senior managers and users from each business unit;*
- ✓ *Internal auditors sitting on the high-level steering committee as observers, who are to provide advice for internal controls, risk management and governance issues as needed;*
- ✓ *A clear decision-making process with well-defined roles and responsibilities;*
- ✓ *Clear lines of authority and communications;*
- ✓ *Qualified, dedicated staffing.*

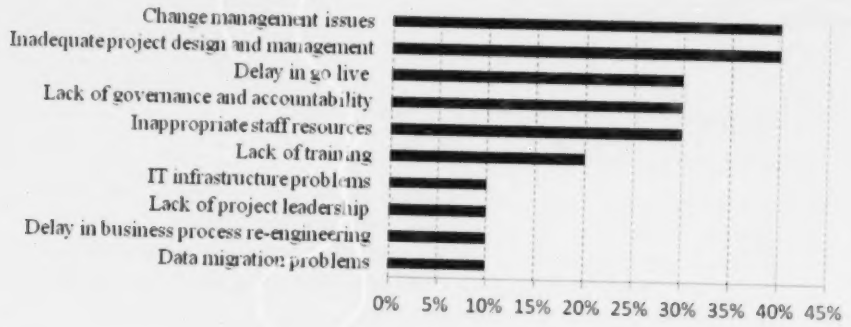
(d) Risk management

49. Ongoing risk assessment of the project and of proposed changes should be an integral part of the project management and governance process. Risks should be assessed at the project management level and communicated to the high-level steering committee or equivalent throughout the ERP life cycle. The costs of risk mitigation actions should also be well defined and communicated to the high-level steering committee, so that it can take a timely and effective decision to mitigate high risks if necessary. Governing bodies should be regularly informed of high risks and the decisions taken in this regard, and should define some of the most important topics and risk mitigation options.

50. Among the organizations studied, 95 per cent[25] reported that they applied risk management to their ERP projects. Top risks as perceived by the organizations reviewed are: change management issues; inadequate project design and management; delay; lack of governance and accountability; and inappropriate staffing (see Figure 2). **However, despite these acknowledged risks, many organizations lack an ongoing effective risk assessment and management framework during the ERP maintenance phase.**

[25] *Ibid.*

Figure 2
Main risk factors for ERP implementation perceived by organizations[26]



Box 4
Success factors for risk management

- ✓ *There needs to be formal risk management from the beginning of the project.*
- ✓ *Risks associated with the ERP implementation need to be assessed, monitored and reported to the high-level steering committee on an ongoing basis, together with the costs of risk mitigation actions.*
- ✓ *Risk assessments need to include risks associated with change management issues, inadequate project planning and management, lack of governance and accountability, inappropriate staffing, lack of training, technical issues, and interdependencies with other major projects and management initiatives, throughout the lifespan of the project.*
- ✓ *High risks and mitigation actions taken should also be reported to governing bodies in a timely manner.*

(e) Change management

51. ERP implementation requires carefully planned change management, expectation management and communications strategy. Lack of users' buy-in in the ERP is one of the main reasons for implementation failure. Risks of user resistance vary depending on the organization's culture and leadership. Moreover, they also depend on the implementation strategy and approach selected, the risks being higher when ERP systems are adopted without customization and when the implementation uses a big bang approach. Those risks should be carefully considered when defining the change management and communications strategies for the ERP project.

52. To support organizational change, users need to be extensively involved in the ERP project's implementation. Most of the organizations reviewed experienced, to

[26] *Ibid.*

varying degrees, some user resistance to change following the implementation of the ERP, partly due to a lack of communication and user training. Senior managers should communicate effectively the expected improvements from ERP at all stages of the project, to manage user expectations about what the system can and cannot do. ERP should not be perceived as a panacea for all long-standing problems, but rather as an integrated system that will require buy-in at the senior management level and from staff who will be using it on a daily basis. In view of the importance of change management, some organizations, such as UNIDO, placed the day-to-day management of the project, including all change management and communication activities required to enable a successful adoption of an ERP system, in the hands of the Office for Change and Organizational Renewal.[27]

Box 5

Success factors for change management and communication

- ✓ *The executive head's demonstrated support;*
- ✓ *Establishing ownership and engagement of senior managers in the project from the beginning;*
- ✓ *Involving users in business process re-engineering from the onset;*
- ✓ *Regular communication from senior managers on the ERP project's status, benefits, challenges and risks, and what the ERP can and cannot do, to manage user expectations;*
- ✓ *Continuous, open communication top-down and bottom-up, to ensure that issues can be detected, addressed and resolved in a timely manner.*

(f) Project staffing

53. Planning for ERP implementation involves ensuring adequate and timely staffing of the project team. Recruitment takes a long time in the United Nations system, and staffing risks and contingencies should be included in the project's plan. Due to a lack of careful planning, the Umoja project was impinged by delays in the team hiring process.[28] During the review, the Inspectors noted that identifying, attracting and retaining knowledgeable staff on ERP were major issues for organizations. In fact, there is currently no formal roster of ERP experts. Moreover, it is difficult for organizations to hire ERP experts as consultants, since the daily salary offered is much lower than the salary they normally receive in the private sector.

54. The more organizations customized their ERP, the more they became reliant on internal staff with specialized knowledge of the system's customizations. This can be problematic, especially since ERP experts may be tempted to move to other organizations implementing ERP which may offer them greater benefits. For

[27] For more information see UNIDO, Unutilized balances of appropriations: Programme for change and organizational renewal: Report by the Director-General (IDB.38/9/Add.2), p. 4.

[28] See United Nations, First annual progress report of the Board of Auditors on the implementation of the United Nations enterprise resource planning system (A/67/164), paragraph 47.

instance, WFP lost some of its most knowledgeable staff on SAP when they moved to the Umoja project.

Box 6
Success factors for ERP project staffing

Define an appropriate project staffing plan starting from the beginning of the project, including:

- ✓ *Planning for staffing over the project's entire life cycle;*
- ✓ *Identifying critical skill sets;*
- ✓ *Identifying, attracting and hiring staff and subject-matter experts with the right skills in a timely manner;*
- ✓ *Incentives, compensation and a rewards scheme to attract and retain qualified staff;*
- ✓ *Preventing and planning contingencies for high staff turnover;*
- ✓ *Appropriate training of the project team; and*
- ✓ *Formalizing knowledge transfer.*

(g) User training and support

55. The Inspectors realized that organizations did not provide enough training before and after ERP implementation. Training was generally provided at the time of the system's implementation. However, according to users, it was often insufficient and too rushed. Successful ERP implementation and use require: the training of senior managers, especially for those on the high-level steering committee, to ensure that they are fully aware of ERP benefits, advanced technical training of key users ("super users") and ongoing end user training. ITU hired consultants before the start of its ERP implementation to train the project team and senior managers participating in the project's high-level steering committee to ensure their full awareness of ERP benefits and functioning. UNIDO also conducted dedicated training on change management and business process re-engineering for its senior managers prior to the launch of the project. However, in many organizations, such training was found to be lacking, leading to some resistance to change, including from managers.

56. ERP impacts the way workflows are carried out. Since ERP systems rely on electronic approval, they require managers to use the system much more than before. However, during focus groups users reported that many managers and professional staffs were resistant to using the system. They did not register for ERP training sessions that concerned them and instead sent general services staff on their behalf. Managers' resistance to change leads to accountability and control issues in the system.

57. The Inspectors found that many organizations lacked adequate key user and end user training after the system had been implemented. Organizations used a "training of trainer" approach and provided e-learning resources on the system,

which were often conceived by the "super users" who had been involved in the implementation of the project. WHO has developed an ongoing training strategy and identified a number of topics to be addressed during face-to-face training sessions (see box 7 below), and some organizations like ITU and the World Bank used a certification scheme, requiring end users to pass a training certification before they could use the system.

Box 7
Key training components identified by WHO

- ✓ Introduction to the ERP (scope and benefits)
- ✓ Elements of navigation and supporting tool (UPK)
- ✓ Records Management and Vacation Rules
- ✓ IPSAS
- ✓ Fixed assets
- ✓ Change Management
- ✓ Awards management
- ✓ Work plan and Human Resources plan management
- ✓ Work plan monitoring and reports
- ✓ Human Resources action plan management
- ✓ Leave and Absence management
- ✓ Self-service functionalities
- ✓ Supplier management
- ✓ Procurement management
- ✓ Travel management
- ✓ Events and Meeting management
- ✓ Financial reporting
- ✓ Adult Learning techniques

58. However, in many cases, no user training was planned by organizations once the system had been implemented. "Super users" had to provide training and support to their peers, and users were encouraged to refer to e-learning resources, although these were not necessarily updated. When key users left, some offices remained without any "super user". If business units or field offices felt the need for additional user training, they had to secure the necessary resources to organize classroom training.

59. The Inspectors found that such an approach is problematic when new staff come to an organization, especially in small field offices, where staff may not have the time to train their peers. In addition, the fact that some users were given access to the system without being familiar with all the functionalities increased the risks of data errors in the system, which can negatively impact on many business processes. Lack of awareness of the system's functionalities also affected users' productivity. In many cases, the lack of training resulted in users' frustration.

60. To solve this problem, Umoja has a training strategy in place that will provide comprehensive training during deployment and after implementation. The plan is to create Local Process Expert Trainers from training hubs and missions who will be trained to become Umoja trainers. These Local Process Expert Trainers will return to their home missions after they have been trained to continue an ongoing post-"go live" Umoja training programme.

61. In terms of support, issues that cannot be resolved by "super users" are usually addressed to another level of support. Some organizations, such as FAO, UNHCR and WHO, have offshored their support services to global service centres. However, many users interviewed highlighted that these global service centres take a lot of time to solve their problems, and that in some cases they never receive any answer, except for an automatic ticket opening notification.

62. Some organizations, such as UNDP, communicate solutions to common problems and changes made to the ERP, through its rich repository of knowledge and specialized practice networks. However, in some organizations, users interviewed were not aware of these solutions and changes. In addition, users in the field also reported a lack of communication to users about the changes made to the system at headquarters.

Box 8
Success factors for ERP training

Define a training plan from the outset, based on a needs analysis, ensuring that:

- ✓ *Senior managers, including high-level steering committee members, receive adequate training before the start of the system's implementation;*
- ✓ *Existing and future staff members and managers receive appropriate training on ERP benefits and on how to use it before they can enter data in the system;*
- ✓ *E-learning materials remain updated;*
- ✓ *Field users receive training in the appropriate language;*
- ✓ *Adequate and timely user support is provided;*
- ✓ *Changes made to the system are communicated to users on a timely basis;*
- ✓ *Kiosks, open forums and blogs where users can share their problems and find solutions are available throughout the project.*

63. The implementation of the following recommendation is expected to enhance ERP implementation's effectiveness:

Recommendation 1

The executive heads of United Nations system organizations should ensure that staff members receive adequate training for their specific needs throughout the system's life cycle, and that appropriate resources are allocated to training on an ongoing basis.

(h) ERP hosting and infrastructure

64. Among the organizations reviewed, 50 per cent of ERPs are hosted in the International Computing Centre (ICC), 33 per cent are hosted internally and 17 per cent are hosted commercially.[29] According to a strategic assessment of ICC conducted by McKinsey and Company,[30] ICC partners believe that its hosting services costs are comparable or slightly more expensive than third parties and in-house operations. ICC officials claimed that if more organizations used their services, hosting costs per organization would decrease.

65. Hosting an ERP is usually a very complex operation, and many factors need to be considered when deciding where to host it. Not all considerations are equally important to all organizations, so there is no "one size fits all" hosting solution. Key factors that should, however, be considered when deciding where to host an ERP include the nature and security of data, costs and operational aspects.

66. ERPs are primarily about unified data within an organization. An issue that needs to be carefully considered is whether the ERP data is of such a nature that it can be hosted outside the United Nations system. Hosting costs to be considered include licence costs,[31] the provisioning and hosting of IT infrastructure and the costs of administrating the application. The question of what is included in the service and what is billed as separate tasks must be carefully analysed by the agencies considering external hosting. Other issues to consider include availability, performance and flexibility, which are greatly impacted by operational aspects. It is desirable to keep users and system administrators close to each other, and to have around-the-clock hosting services.

67. In principle, ERP can be implemented "on premise" — i.e. with the software installed on servers within an owned data centre — as United Nations organizations have done so far, and as SaaS, also referred to as "on-demand software" — i.e. using cloud-based application software. Cloud-based software implementation can be seen as problematic by some United Nations system organizations due to security and data confidentiality concerns. A table of the average recurring ERP hosting costs incurred by organizations reviewed is provided in Annex IV. Reducing these costs requires economies of scale. **United Nations system organizations should therefore consider common hosting solutions to benefit from economies of scale.**

68. ERP systems require good Internet connectivity to function well, although it is expected that with technological evolutions, future versions of ERP will allow users to work offline. Organizations that plan to implement ERP in the field first need to ensure that there will be adequate Internet connectivity in the field offices where it is expected to be used. Organizations may have to implement network optimization initiatives or to install satellites in some country offices before ERP can be implemented.

69. For example, when it started implementing its ERP, WFP installed a satellite in each country office so that users could still connect to the system if the local provider connection was not working. Bandwidth differed depending on the size of

[29] Source: JIU questionnaire.

[30] McKinsey and Company, "Strategic assessment of ICC: Final report", 9 May 2011, p. 17.

[31] Organizations can either purchase the software themselves or get it directly from hosting providers, some of which may give significant discounts.

the office and on the number of users expected to be connected at the same time. WFP therefore defined three different levels of bandwidth according to the number of users. UNICEF utilized a very scientific approach, simulating future usage load (combination of all applications), measuring all global sites for last mile quality issues, swapping low quality providers against satellite links, selectively upsizing bandwidth, and combining all interventions with hardware- and software-based link optimization. In the Inspectors' view, **organizations should ensure the provision of stable Internet connectivity and infrastructure in all the locations where the system is planned to be implemented. The risks associated with low Internet connectivity in field offices should be carefully assessed, managed and mitigated.**

(i) Data conversion and systems integration

70. ERP implementation implies data cleansing, migration and archiving. It may also involve data enrichment activities, especially in the context of a "vanilla" ERP implementation, as the data required by the system may be more comprehensive than the one captured in legacy systems. Moreover, in many organizations reviewed, ERP implementation also implied the ERP systems' integration with legacy and/or third party systems, since specific business processes cannot necessarily be handled in the ERP. For example, Umoja Foundation's implementation will require integrations with many different legacy systems in all duty stations, which still remain to be planned and funded.

Box 9
Success factors for data conversion and systems integration

- ✓ *Resources and time required for data cleansing, migration and archiving, and systems integration need to be assessed, as well as their impact on business units' productivity;*
- ✓ *Costs of data conversion and systems integration have to be well planned and budgeted; and*
- ✓ *Standards and validation processes need to be established and training provided, to ensure that data is entered in the ERP database in an accurate and consistent manner.*

(j) ERP upgrades

71. ERP providers release a new version of the software every four to five years, and push organizations to upgrade their ERP. Full support is provided by vendors for approximately five years, starting from the release date of the software. The extended support phase provides an additional two- to three-year window for organizations to plan and implement an ERP upgrade. Not upgrading the system beyond the extended support phase is risky, since providers are no longer responsible for the resolution of specific bugs or for incompatibility with former or new third party software releases. Organizations therefore have to upgrade their software at least once every seven years. For example, UNHCR is planning an upgrade of its human resources module which will not be provided with extended licence support starting from 2013.

Box 10

Benefits and opportunities provided by ERP upgrades

- ✓ *Enable organizations to continue benefiting from the full support services which they are paying for as part of their annual software maintenance costs;*
- ✓ *Mitigate the risks associated with the operation of an unsupported platform;*
- ✓ *Give them access to new software functionalities, and fix former bugs;*
- ✓ *Enable organizations to remove some customizations as a result of new features that have been developed to address global user feedback;*
- ✓ *Provide organizations with the opportunity to enhance their business processes and accommodate changing requirements; and*
- ✓ *Support the adoption of new technological solutions and software releases.*

Box 11

License support/maintenance phases used by Oracle[32] and SAP[33]

Type	*Key features*	*Approximate end*
Oracle		
Premier support	Provides full support, including new releases, patches, technical support, access to knowledge base, fixes, security alerts, certification with most existing and new Oracle and third party products and versions.	5 years after the version has been released
Extended support	Provides most of the services mentioned above, but does not include certification with most new third party products or versions	3 years after premier support has ended
Sustaining support	Does not provide new fixes or patches, and does not include any certification of existing or new Oracle or third party products and versions.	Indefinite
SAP		
Mainstream maintenance	Provides full support including new releases, patches, technical support, access to knowledge base, fixes, security alerts, certification with most existing and new third party products and versions.	5 years after the version has been released

[32] See Oracle software technical support policies, 15 August 2012, at: http://www.oracle.com/us/support/library/057419.pdf.

[33] See Licensing SAP products — a guide for buyers, at : http://www.sap.com/asset/index.epx?id=68939f62-732f-4d6b-b1d0-fe30ebe89387.

Type	*Key features*	*Approximate end*
Extended maintenance	The scope of support provided via extended maintenance is usually similar to that of mainstream maintenance, with some restrictions. This support phase is optional and requires a separate contract.	2 or 3 years after the end of the mainstream maintenance
Customer-specific maintenance	Customer-specific maintenance does not provide support packages, legal changes or customer-specific problem resolution. It gives only limited technology upgrades. It does not provide service level agreements and does not guarantee problem resolution for third-party softwares that are no longer maintained by the vendor.	Indefinite

72. In specific cases, organizations may choose not to undertake full upgrades due to other major business transformation initiatives already going on within the organization. In such instances, organizations may choose to do only a technical upgrade, to benefit from the providers' full technical support services, and move the system onto the latest technology platform while maintaining the same business processes. However, there may be cost overruns with this approach since the technical upgrade of a customized system will require the reimplementation of the system's customizations. These organizations will nonetheless have to undertake a full system upgrade after the technical upgrade has been implemented in order to use new and enhanced ERP functionalities and benefit from the full capabilities of the system.

73. Because it is undergoing a major reform process, expected to be implemented in 2013, and its extended licence support will end in the same year, WHO decided to undertake a technical upgrade of its ERP, to mitigate the risks associated with an unsupported platform as well as those arising from the simultaneous implementation of several major transformational projects. WHO decided that separate projects related to system transformation and simplification would be launched subsequently after the technical upgrade project to address WHO reform needs, standardization and improvements. **In the Inspectors' view, WHO should take the opportunity of the planned technical upgrade to streamline its business processes, with a view to benefiting from a mature ERP system with enhanced business processes and system functionalities, reducing the number of customizations in the system and avoiding cost overruns.**

(k) Auditing

74. Among the organizations studied, 73 per cent reported that their ERP project was audited externally and 68 per cent that it was audited internally.[34] In the Inspectors' view, internal and external oversight bodies have an important role to play at all stages of the ERP life cycle to review and comment on the project's internal controls, governance and risk management, and recommend ways and means to solve identified problems.

75. One of the recurrent internal controls issues was the importance of having strong user profile management, segregation of duties and payment controls for mitigating risks associated with the ERP. In fact, if user profiles and permissions are

[34] Source: Umoja survey.

not well managed, users may be able to complete entire processes, such as purchase orders, and to approve payments without requiring any validation from managers, creating risks of fraud.

76. Data security and the question of disaster recovery were also issues of concern for internal auditors interviewed, since ERP systems should normally integrate all the electronic data of an organization.

III. Use and impact

A. ERP use

77. The Inspectors found that in most organizations ERP has first been implemented to support human resources and finance processes. As can be seen in Annex II, there are commonalities and differences between organizations in the use of ERP capabilities. The human resources module was usually customized to reflect United Nations organizations' staff regulations and rules. Nonetheless, in many organizations, human resources staff complained that the system did not accurately reflect human resources processes, requiring users to spend additional time on manual workaround.

78. ERP was also used for programmes and project management purposes, including by organizations that heavily rely on extra-budgetary resources, to address donors' requirements for enhanced reporting and transparency. The implementation of ERP in this area was usually more difficult, due to a lack of clearly agreed modalities. Some organizations successfully implemented a programme and project management module which allowed for systematic results-based project management and risk management. The United Nations Human Settlements Programme (UN-Habitat) is negotiating to procure a cloud-based system for project management — PAS — while waiting for, and to complement, the implementation of the Umoja extension. Entirely funded by extra-budgetary contributions, it decided to look into PAS to satisfy donors' requirements for better specified financial and project reports.

79. Due to a lack of standardization, organizations also had difficulties implementing ERP procurement, supply management and logistics modules. They tended to customize these modules, or to use a third party or legacy systems to handle those business processes. Until now, all WFP logistics business processes have been supported by a legacy system which is linked to the ERP. WFP is now in the process of designing its ERP logistics module to enhance systems integration and cost-efficiency. Pilots of the new module were already conducted in Liberia and Sierra Leone.

80. The Inspectors observed that most of the organizations that implemented ERP did not use the system's reporting module, and that those that implemented it still need to make the reports more user-friendly. There are two different ways to get reports from ERP: they can be generated live from the system using the reporting module, and they can be created using data warehouses, which may store data from the ERP and from multiple systems for business intelligence and reporting purposes. However, most organizations are still missing or in the process of implementing these solutions.

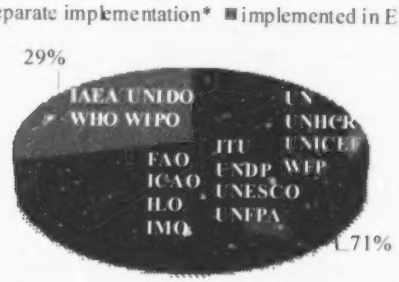
81. Part of the problem faced by organizations with the creation of reports is that governing bodies, donors and senior management have different and varying reporting requirements, leading organizations to spend more time and resources on the creation of custom reports. **Organizations should ensure that the reporting functionality is flexible and allows for the creation of reports that address general stakeholders' information needs, rather than trying to create custom reports tied to specific requirements.**

82. Member States', donors' and managers' information requirements could also be addressed by giving them access to online dashboards,[35] where they could access information in real time. UNIDO has developed online dashboard/reporting tools in the ERP system in close cooperation with its member States and donors. The reporting tools, which also enable reporting on results and risk management, will be rolled out to UNIDO stakeholders in early 2013, once all ERP modules have been implemented. UNDP has an online dashboard functionality which supports managers' decision-making. The main caveat to this approach is that data coming from legacy or third party systems connected to the ERP may not be updated in real time. Therefore, when an organization's stakeholders are given access to an online dashboard, they should be made aware of potential limitations of the data provided in the system. They should also be well informed about how to run meaningful queries in the system.

83. As can be seen in Figure 3, most organizations with ERP systems that implemented results-based management/budgeting (RBM/RBB), enterprise risk management (ERM) and/or performance management did not run it in ERP, although ERP can support these processes. Organizations preferred to use a more customized system rather than re-engineering their business processes. At least during their initial ERP implementation, organizations tended to underutilize the system's functionalities. In the Inspectors' view, **it would be more cost-efficient for organizations to use the full functionalities provided by ERP systems.**

Figure 3

Organizations that implemented RBM, ERM and/or performance management in ERP and separate systems[36]



* Includes organizations that implemented neither RBM nor ERM or performance management in ERP.

** Includes organizations that implemented at least one of the three initiatives in ERP.

[35] A dashboard is a user interface that shows a graphical presentation of information in a way that is easy to read, to support informed decisions at a glance.

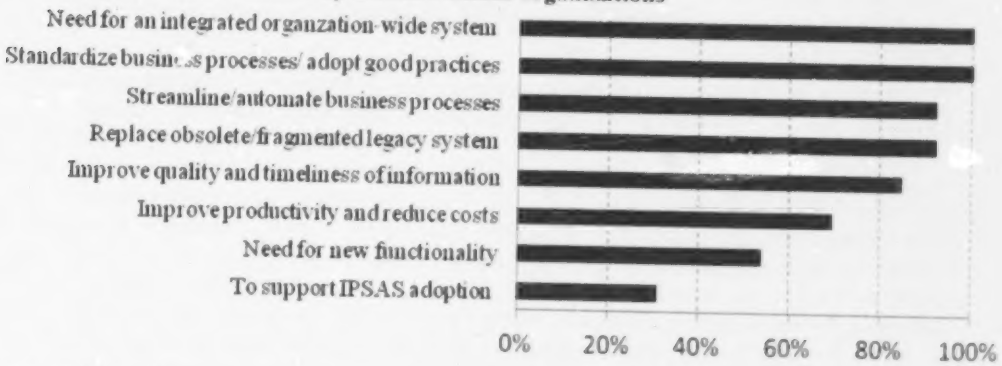
[36] Source: JIU questionnaires.

B. Effectiveness

(a) Expected ERP benefits

84. Figure 4 provides an overview of the expected ERP implementation benefits reported in the joint CABIO/SAP-SIG participants' survey. These included having an integrated organization-wide system as well as standardized and streamlined business processes.

Figure 4
Expected ERP benefits by United Nations organizations



(b) Monitoring and reporting on ERP achievements

85. Among the United Nations system organizations reviewed, the Inspectors found that while most organizations define expected ERP outputs and outcomes in their business cases for ERP implementation, few of them tried to measure quantitatively their ERP benefits. While FAO and WFP[37] have conducted benefits assessments of their ERP, most organizations lack baseline data and corporate quantitative indicators to measure ERP benefits.

86. As regards the United Nations Secretariat, various ACABQ reports over the years on the ERP project have "repeatedly stressed the importance of establishing a detailed project plan, including project milestones, deliverables and costs, recording baseline information on key parameters at the time of project approval and documenting changes as the project evolves (see A/64/7/Add.9, para. 72). Among the key parameters to be documented are: goals and objectives of the project, its geographical and functional scope, key milestones and deliverables, expected benefits, risks, assumptions, constraints, out-of-scope functions, staffing, cost estimates and funding, as well as the project governance and management structure". The most recent Committee report (November 2012) again reiterates these needs, stating that "[t]he Committee continues to believe that the General Assembly should be provided with detailed information on the project plan, along with baseline information that can be used to assess progress as the project evolves. It reiterates

[37] WFP concluded that the quantifiable benefits of its ERP included: "i) effectiveness improvements, with potential cost savings or cost avoidance; and ii) productivity improvements, to deliver higher-value activities with the same workforce." It estimated that recurrent annual cost savings or cost avoidance resulting from ERP amounted to US$ 11.55 million.

its earlier request and recommends that such a plan and baseline information be provided in the next progress report".[38]

87. In their qualitative benefits assessment, most organizations reported that the expected benefits of ERP implementation had been achieved, at least partially.[39] One of the ERP benefits considered was cost savings in terms of staffing. The IMO measured the tangible benefits realized in terms of temporary and permanent staff savings, as well as overtime savings, reporting that "[t]he reduction in permanent staff costs is planned for some 12 months .... This reduction will be realized, therefore, over the coming months, as part of an ongoing process of redeploying Administration resources in support of the front-line business".[40] However, the Inspectors observed that most organizations did not measure the cost savings or cost avoidance brought by ERP.

88. Moreover, the Inspectors found that while most organizations collected users' feedback during the design and implementation stages of the ERP through representatives from relevant business units, there was no feedback mechanism put in place at the post-implementation stage of the system. Most users in the field did not communicate with headquarters about the issues they were facing. Organizations could identify issues faced by users with satisfaction surveys, online forums, discussion groups, common issues submitted to service desks, the amount of time taken to resolve these problems, lessons learned and good practices. However, according to users in the field who participated in JIU focus groups, common problems identified and reported to headquarters by support staff were not addressed. **Organizations should ensure that users' feedback is monitored throughout the ERP life cycle, in order to identify and address the systems' negative impact and risks in a timely and effective manner.**

89. ERP systems comprise major investments throughout their life cycle. Member States undertake these investments with the expectation of greater efficiency and effectiveness in the functioning of the organizations. Any significant failure on the part of project implementation might naturally have a detrimental effect on the expected benefits/objectives and overall flow of the functions. Therefore **ERP projects represent strategic investments for organizations, that require close monitoring and reporting mechanisms on total cost of ERP ownership, the progress of implementation and achievement of expected benefits.**

90. **Monitoring should be both at the level of senior management and legislative/governing bodies. Senior management should frequently discuss project plans, progress and related problems so that they can have ownership of issues and take timely measures to prevent risks. As main stakeholders, the legislative/governing bodies on oversight should not be underestimated. Close oversight by governing bodies would escalate the importance of the project, provide better discipline and motivation on the side of management, and facilitate timely decision-making by governing bodies for successful implementation. In order to facilitate better monitoring and oversight, there should be regular internal (to senior management) and external (to governing body) reporting.**

[38] Enterprise resource planning project: Report of the Advisory Committee on Administrative and Budgetary Questions (A/67/565), para. 40.

[39] Source: JIU questionnaires.

[40] See IMO, Change Management Programme: Note by the Secretary-General (C 93/7/Add.1), paragraph 3.

91. The implementation of the following recommendations is expected to enhance the effectiveness of ERP projects:

Recommendation 2

The legislative/governing bodies of United Nations system organizations should exercise their monitoring and oversight role on their respective ERP projects on an ongoing basis, including implementation, maintenance and upgrade policy, cost-efficiency and achievements of the overall objectives of the projects.

Recommendation 3

The executive heads of United Nations system organizations should establish regular monitoring and reporting mechanisms for ERP projects throughout their life cycle.

C. Impact and value added

(a) Streamlined and integrated business processes

92. ERP systems allow the streamlining, standardization and greater integration of business processes. They can support organizations' reforms, such as offshoring and decentralization, allowing staff to perform similar tasks in all duty stations where the ERP functionality has been implemented. As an illustration, UNHCR transferred its ERP project, main administration services and global service desk to its Global Services Centre in a lower cost location. Likewise, FAO and WHO established offshoring centres in Budapest and Kuala Lumpur, respectively. However, the WHO decision to launch its ERP and Global Services Centre at the same time had a negative impact on both initiatives, since ERP users lost the proximity of user support, while the newly hired Global Services Centre staff had to learn about the organization's administrative processes.

93. Organizations need to ensure adequate segregation of duties in the system, which is often difficult to achieve in small offices in remote locations due to the limited number of staff. In view of the difficulty of implementing complex systems in the field, many organizations limited the business processes that could be completed in field offices, and managed complex processes from headquarters, regional offices or from their global services centre. The DFS Global Field Support Strategy foresees the consolidation of many administrative support functions in regional centres, as is the case in Entebbe, Uganda. On the other hand, the centralization of processes specific to a field location may prove more time-consuming for staff in the field than a more decentralized approach.

94. **Recalling the JIU report on offshoring,[41] the Inspectors would like to reiterate that organizations should assess the costs and benefits of all sourcing options for the delivery of services, according to their mandate and corporate strategy. Such an analysis should take into account the costs, benefits and risks of deploying complex ERP modules in field locations, taking into consideration other major business transformation initiatives already under way.**

(b) Improved information management and reporting

95. ERP systems allow data consolidation in a single database, which allows users to aggregate and retrieve data more easily and in a timely manner. They are management tools that can support enhanced reporting, forecasting and decision-making. As an example, the implementation of IPSAS with ERP facilitates the creation of financial reports.

96. However, during the focus groups, the Inspectors found that several organizations were still having reporting issues, forcing users to download raw data and create reports manually. One of the main problems users had was the inaccuracy or incompleteness of data in the system, which would lead to inaccurate query results and reports. In one organization, users reported that since the system's query results on donor contributions were inaccurate, they used Excel to track contributions, in parallel to the ERP.

97. There were several factors which could lead to such data inaccuracy issues, including the fact that: data available in the system was incomplete and did not provide the whole picture; data was incorrectly entered into the system, mainly due to a lack of training; and there were problems with systems integration, which resulted in data consolidation issues.

98. Moreover, several organizations had reporting problems because users did not know how to create reports in the system. They would generate and manually consolidate reports from different dates, leading to inaccurate reports. Other issues faced with reports included the fact that they lacked appropriate captions to be easily understood, and that some systems were too customized to be able to use the ERP reporting functionalities.

(c) Efficiency gains

99. Most organizations reviewed reported in the questionnaires that ERP enhanced efficiency in their organizations. ERP systems allow timely access to income, budget and expenditures data, enabling more efficient management of financial and human resources, as well as strengthened financial controls. For instance, in WFP, ERP allowed managers faster access to inventory information and therefore enhanced the management of its global supply chain.[42] The use of electronic workflows can also facilitate the completion of business processes. However, achieving long-term efficiency gains often requires a redistribution of roles and responsibilities within the organization, according to the revised business processes.

100. By enabling the consolidation of all business processes in a single integrated system, ERP systems will help avoid the maintenance costs of legacy systems,

[41] See JIU, Offshore service centres in United Nations system organizations: Offshore service centres (JIU/REP/2009/6), recommendation 1.

[42] See WFP, WINGS II value assessment (WFP/EB.A/2011/6-F/1), p. 7.

provided that these systems are decommissioned when the ERP is implemented. Moreover, by centralizing and standardizing data, ERP systems make duplicate data entry unnecessary and information gathering easier, allowing staff to spend more time on higher-value activities. However, in many cases, the lack of usability and accessibility of the system impinged on staff productivity.

101. In all the organizations reviewed, users reported that the system was not user-friendly. Navigating the system is not intuitive and requires extensive user training and practice. ERP systems are also cumbersome because it is very difficult for users to identify and correct mistakes. In most cases, they have to go through the entire workflow again to be able to make a correction.

102. Some organizations customized their ERP to simplify navigation and make the system more intuitive. The main area where customizations were requested by users to simplify their work was human resources, due to a mismatch between ERP business processes and organizations' rules and procedures in this area. However, most ERP users reported that customizations had added even more steps to workflows and made the system even more cumbersome to use. Many users felt therefore that organizations should take the opportunity of upgrades to revisit and improve business processes as well as the usability of the system. Investing resources to enhance the system's navigation would improve staff productivity.

103. Users from several organizations, at headquarters and in the field, also reported that their ERP was very slow, and therefore very time-consuming. In some cases, when the system froze, users had to restart the workflow they were working on. Performance issues can have several causes, including problems with Internet connectivity, high customization of the system, infrastructure problems and/or desktop issues. Since the performance of the system is as good as its weakest point, the problems should be identified. In the Inspectors' view, **organizations that implemented ERP should ensure that the systems' usability and accessibility are enhanced to improve staff productivity, taking the opportunity of the next system's upgrade to address these issues.**

(d) Built-in internal controls

104. ERP systems allow the creation of built-in internal controls, including budgetary and funds sufficiency controls, as well as the management of users' permissions according to their role and profile. This can reduce the paperwork required for the initiation of a business process. On the other hand, it may remove some of the flexibility that organizations would usually have with their traditional business process. As an example, with an ERP, users may not be able to initiate a project or start hiring a person if there is no budget available in the system for that activity.

105. By integrating all the business processes of an organization, ERP makes it possible to define duties and lines of authority more clearly and to enhance accountability and transparency in an organization. The system also increases transparency by recording the name of the user adding data to the system, as well as the history of changes made on workflows. However, the system requires managers' accountability for electronic approvals, and well-defined user roles and segregation of duties in the system, which seemed to be lacking in several organizations. It also necessitates the key business processes to be integrated in the ERP. As an example, since the human resources module will not be implemented as part of the Umoja

Foundation phase, reporting lines will not be defined in the system at the time of its implementation.

106. During the focus groups, the Inspectors found that in several organizations, managers required paper-based approval workflows in parallel to the electronic ones already in the system, and delegated their electronic approval authority or gave their passwords to administrative assistants. Many things could thus be approved in ERP without being reviewed by managers, who did not take responsibility for approvals made in the system.

107. In many cases, controls were also lacking. As users got more accustomed to the ERP, some of them discovered breaches in the system, increasing potential risks of fraud. In one organization, users from different locations were able to change the name of buyers and suppliers in purchase orders after payments had already been made. In three other organizations, a human resources workflow could be processed from its creation until payment by the same person, without requiring any control.

IV. Coherence and sustainability

A. Coherence and collaboration

(a) Harmonization and efficiency

Box 12
Ongoing system-wide collaboration initiatives

- ✓ *The CEB HLCM, composed of the executive heads of the United Nation system organizations, has been working since 2009 on a Plan of Action for the Harmonization of Business Practices.*
- ✓ *The CEB ICT network brings together the ICT leadership of United Nations system organizations and conducted studies on the harmonization of ERP systems.*
- ✓ *SAP-SIG and CABIO respectively bring together IT staff from organizations using SAP and Oracle, include vendors' sales representatives and enable organizations to share knowledge and discuss common requirements.*
- ✓ *The ICC Management Committee, consisting of executive heads of ICC partner organizations, discussed the role of ICC regarding the negotiation of licences with ERP providers. The Management Committee includes most CEB organizations. Non-member organizations may also participate in the Committee's meetings as observers.*

108. The Inspectors found that although there is no coherent United Nations strategy regarding ERP implementations, ERP has led to a certain degree of harmonization of business processes across the United Nations system, since, over time, organizations tend to re-engineer their business processes and to align them to good practices embodied in ERP systems.

109. Moreover, UNDP shares its ERP with UNOPS, UNFPA, UN-Women, the United Nations University (UNU) and the United Nations Capital Development Fund (UNCDF), and WHO shares its ERP with the Joint United Nations Programme on HIV/AIDS (UNAIDS). This has also led to a certain extent of business process harmonization across the organizations using their respective systems, although some organizations implemented customizations to satisfy their specific needs.

110. UNICEF is spearheading efforts under SAP-SIG to work closely with SAP and WFP to enhance native SAP to develop a standard IPSAS-compliant United Nation common system, along similar lines as a non-profit organization's solution for payroll. Notwithstanding the considerable ERP investments that have already been made by most organizations, one of the main issues preventing greater ERP coherence is the fact that organizations have different rules and regulations, charts of accounts and reporting practices. As an example, a common payroll would require the harmonization of staff rules and regulations, entitlements and benefits across the system. Many organizations highlighted that business process harmonization had to be addressed by organizations' senior managers and not IT staff, and that the CEB ICT Network was therefore not the forum for such harmonization.

111. During the preparation of this report, a review of Procter and Gamble's experience in the private sector provided useful insights on the possible consolidation of multiple ERPs.

Box 13
The experience of Procter and Gamble in business process harmonization

Procter and Gamble is composed of multiple legal entities around the world. Until the mid-1990s, Procter and Gamble operated with a global headquarters and many small, largely independent brands and business units scattered in different regions, and each country was using its own system. In 1999, the company launched a global initiative to restructure the entire firm into three types of organizations: Global Business Units developing brands; Market Development Organizations fostering local understanding and focusing on sales and marketing by geographical location; and a Global Business Services unit providing support functions to the Global Business Units and Market Development Organizations, in areas such as IT, procurement and accounting.

As part of the Global Business Services creation, Procter and Gamble offshored finance and human resources in Costa Rica, the Philippines and the United Kingdom, leading to the standardization of these business processes.[43] *Using the shared services centres, it managed to achieve a common platform for finance in three years. While many system configurations were implemented, only a few customizations were made. However, some processes, such as sales and distribution, that were broader required add-ons to address specific needs.*

[43] Since 2003, many support services are now outsourced to third party companies specialized in those services, such as Hewlett Packard for IT infrastructure, applications and transactional accounts payable.

Today everything[44] is run in ERP. Overall, it took from the late 1990s until the end of 2011 and a complete restructuring of the company for Procter and Gamble to align all its business processes and have one ERP globally across all core processes. By consolidating its business processes, the company was able to achieve savings as well as financial, strategic and operational benefits.

112. The Inspectors realized that over time, organizations will re-engineer their business processes and better align them with good practices embodied in ERP systems. Moreover, thanks to evolving technology, different systems can now be integrated with a view to enhancing data sharing across organizations. While most organizations reviewed reported that progress in this area was limited, they nonetheless identified some opportunities for systems integration, including the United Nations Staff Joint Pension Fund (UNJSPF) and payments reconciliation in UNDP. ITU recently upgraded its system so that it can be interfaced with UNJSPF; UNIDO agreed to be an early adopter of the pension fund interface run by UNJSPF; UNHCR developed a fully automated interface between the human resources module of its ERP and UNJSPF. Several organizations are currently considering doing the same.

113. Due to its large field presence, UNDP provides services to other organizations at the country level, such as the Office for the Coordination of Humanitarian Affairs (OCHA), ILO and UNWTO. Transactions are entered in the UNDP ERP system, and the country support service at headquarters then sends reports to each organization using UNDP services. Organizations then have to reconcile the numbers for these transactions. In the Inspectors' view, **organizations using UNDP services in the field which already have an ERP, should undertake a cost/benefits analysis of the integration/interface of their system with the UNDP ERP, with a view to having more complete, timely and accurate data from the field in their system.**

114. As proved in the cases of UNDP, WHO and Procter and Gamble, it is possible for different organizations to use common ERP systems. This would not only bring greater efficiency, but also speed up the harmonization of business processes and facilitate the achievement of "delivering as one" or, in other words, "One United Nations". Therefore, the Inspectors are of the opinion that, **as suggested by ACABQ, United Nations organizations should look for opportunities for convergence towards the adoption of common ERP solutions and for enhancing existing systems' interoperability. In the long run, technology and maturity in ERP use would facilitate the use of one shared system across the system. Organizations that have not yet implemented ERP should consider the possibility of using an existing ERP system rather than implementing a new one.**

(b) Collaboration in ERP support

115. WFP set up a project called Transcent to assist organizations implementing the SAP ERP on an ad hoc basis, to implement process re-engineering and an IPSAS-compliant ERP. So far, it has signed memorandums of understanding (MoUs) with UNRWA and CTBTO. The project involves mainly support from IT staff at WFP,

[44] Finance, accounting, human resources, supply chain, sales and distribution processes.

including secondment of business owners if needed. It also has an agreed cooperation framework with the United Nations Secretariat through which WFP logistics staff members spent one month working with Umoja in March 2012.

116. The project strains the organization's resources, and in the human resources view of WFP, it would be better to have it as a shared unit whose costs would be shared among organizations. Moreover, there is currently no similar project helping organizations using Oracle. Transcent is expected to work closely with ICC, so that it grows in ERP application support. **In the medium term, the services provided by Transcent should be expanded to include Oracle, and provided in a more sustainable inter-agency collaboration framework.**

117. The Inspectors noted that the CEB HLCM has made efforts to harmonize business practices in the United Nations system, covering all the major management functions of organizations, including human resources, procurement, ICT, finance and budget. **In the view of the Inspectors, the Secretary-General, in his capacity as Chairperson of the CEB, should effectively share their ERP experiences, good practices and lessons learned, discuss project plans, and speed up HLCM efforts to enhance and harmonize business practices, with a view to improving ERP implementations and enhancing coherence and efficient collaborations in the use of ERPs across the United Nations system.**

(c) Negotiations with ERP providers

118. The ERP market is one where suppliers have a disproportionate amount of negotiating power relative to customers. Once organizations have started implementing ERP software, it is very difficult for them to switch to another provider, in view of all the investments already made, including in terms of training. While the public sector is a big market for ERP providers, they are unlikely to customize systems for United Nations system organizations, especially if there are no common requirements identified by them. They should therefore enhance their collaboration to come up with common requirements and negotiate with ERP providers, so that, where feasible, ERP standard products can address these requirements.

119. Negotiating with ERP providers is a complex task, which requires specific knowledge and skills. Regarding licences, each organization pays a different price for the same software licence. Some organizations may have an 80 per cent discount, while others that implemented ERP only recently may only have a 30 per cent discount. To increase their revenue, ERP providers tend to adopt a "divide and conquer" strategy, arguing that each organization's different business model requires a different treatment. Providers will only negotiate with one instance if the United Nations speaks with one voice.

120. The WFP Transcent project seeks to help organizations negotiating with SAP, in collaboration with ICC. Moreover, several participants in the joint CABIO/SAP-SIG meeting raised the idea of having ICC help organizations negotiate contract prices with ERP providers. In this regard, ICC submitted a paper to stimulate a discussion on whether to move in this direction.[45] In this paper, ICC sought from its

[45] See document ICC MC89/4.2 on contracts negotiation and management that was presented at the eighty-ninth session of the ICC Management Committee in April 2012.

Management Committee some clarity on how to proceed and presented three possibilities:

(a) Option 1: ICC could do nothing, i.e. each organization carries out its own negotiation process;

(b) Option 2: ICC could offer contract negotiation and contract management as a service to clients;

(c) Option 3: ICC could be part of a mandatory United Nations system contracting — United Nations system organizations would identify a list of suppliers for which they would agree to only negotiate contracts as a whole. ICC could take the lead on one or more suppliers if that was the wish of its clients.

121. According to ICC, options 2 and 3 would require a new resource which should be headed at the D-1 level, with a substantial proportion of the costs recovered from partners as part of projects, and with an expectation that someone working at this level would more than cover their own costs through the savings and benefits delivered from successful negotiations. The Management Committee members expressed an interest in ICC providing a service. They requested that ICC work further on this item in order to present at the next meeting a concept that could be turned into a service. The group also noted that the Chair of the Procurement Network was with ILO, whose representatives proposed to facilitate the initial contacts if it was required.

122. It is important to note that information on long-term agreements should be shared through the United Nations Global Marketplace, which shows no contracts regarding ERP with the exception of some contracts for some consultancy services. ERP contracts were not included in the United Nations Global Marketplace.

123. In the Inspectors' view, **the CEB HLCM should establish a task force to review system-wide opportunities for ERP collaboration and better position United Nations system organizations vis-à-vis ERP providers.**

B. Sustainability

124. Technology constantly evolves, and new ERP software versions are released every four to five years. Organizations have the opportunity to enhance their ERP system and adopt new features and functionalities to meet changing business needs at each ERP upgrade. The latest versions of ERP software also support most new third party products, thus enabling organizations to leverage their ERP system to use new technologies and roll out new applications more easily. Organizations' capacity to upgrade their ERP systems depends on the extent to which the systems have been customized. The more "vanilla" the system is, the easier and less costly it is to upgrade.

125. Recent trends in the ERP industry include the development of cloud-based SaaS modules, middleware[46] that enables systems' integration, enhanced business

[46] "Middleware allows application components to communicate through standardized messages, which simplify the coupling between systems. As a result, the integration of disparate applications becomes increasingly flexible and manageable; indeed, middleware can integrate applications running not only within but also beyond a company's boundaries". See McKinsey and Company, "A second wind for ERP", *McKinsey Quarterly* (May 2000).

intelligence and analytics functionalities, as well as mobile applications for ERP. The IMF implemented mobile versions for some modules, including for leave approval requests, expense reports and travel tools. The World Bank is looking at increasing the use of mobile applications for transactions.

126. ERP providers are developing their cloud-based services, which are already widely used in the private sector, especially by small and medium-sized enterprises. Moreover, based on a survey of ICC partners, McKinsey and Company found that there is a high demand for cloud services, and concluded that ICC should seize the once-in-a-decade cloud opportunity and provide private cloud-based services to United Nations organizations.[47] Cloud-based tools provide easy-to-deploy solutions, at lower cost than "on premise" services. They reduce hosting costs and allow users to pay only for what they need. They provide flexible and scalable solutions that can adapt quickly to business growth.[48] However, third party hosting solutions, including public cloud[49] solutions, might raise confidentiality concerns to some organizations with regard to sensitive data.

127. SaaS does not seem to be mature enough to provide all the functionalities required by large organizations. It tends to be a solution more adapted for small organizations with limited needs and resources, although it can also be used to complement an ERP system's functionalities, like the IMF, keeping in mind that SaaS modules tend to be difficult to integrate.

128. The CEB ICT Network is working on the cloud issue from a technical point of view, but the United Nations system needs a comprehensive policy, including legal aspects, regarding the cloud. While some organizations like the IMF consider public cloud solutions to be like any third party hosting solution, others, such as the World Bank, have security and data confidentiality concerns regarding commercial clouds. Since some United Nations entities like UN-Habitat are already considering the adoption of public cloud-based solutions, the United Nations system should not pass up the opportunity to define a common approach towards the cloud.

129. Common drivers for ERP evolution usually include: the evolution of ERP software, the provision of enhanced functionalities to address changing business needs and cost reduction. Most of the organizations reviewed do not have an ERP sustainability plan. However, many noted that ERP strategies are intertwined, and should be aligned with ICT strategies. Recalling recommendation 7 of the JIU report on ICT governance, which states that "[t]he executive heads of the United Nations system organizations should make sure that their ICT strategies are closely aligned to the organization's medium- and long-term strategic plans, or equivalent, so as to ensure that ICT sustains and supports the organization's business needs and mandates",[50] the Inspectors highlight that ERP strategies should be closely aligned to organizations' medium- and long-term strategy. **For the successful maintenance and enhancement of ERP systems, organizations should develop sustainability plans to ensure that their ERP system is closely aligned to their medium- and**

[47] See McKinsey and Company, "Strategic assessment of UNICC: Final report", 9 May 2011, p. 17.

[48] For more information, see: www.sap.com/solutions/technology/cloud/overview/index.epx, and www.oracle.com/us/solutions/cloud/overview/index.html.

[49] In general, public cloud solutions are made available to the general public by a service provider via the Internet. On the other hand, a private cloud is operated solely for one organization.

[50] See JIU, Information and communication technology (ICT) governance in United Nations system organizations (JIU/REP/2011/9).

long-term strategic plans, and can be adapted to evolving business needs and technology.

130. The implementation of the following recommendation is expected to enhance efficiency:

Recommendation 4

The Secretary-General, in his capacity as Chairperson of the CEB, should direct the CEB HLCM to develop a common United Nations system policy regarding cloud-based solutions, before the end of 2014.

Annex I

Summary of relevant parts of previous JIU reports related to ERP

A common payroll for the United Nations system organizations (JIU/REP/2005/04)

The Inspectors noted that most of the organizations of the United Nations system had developed their own management information systems, based on disparate solutions ranging from in-house developments to commercial ERP products of various vendors (SAP, PeopleSoft, and Oracle). Moreover, the systems were at different stages of information systems development, some having been newly implemented while others were older and needed to be replaced. Noting that investments in management information systems alone across the United Nations system organizations exceeded US$ 1 billion over the prior 10 years, and given the significant resources required on an ongoing basis for the operation, maintenance and support of such systems, the Inspectors highlighted the need to accelerate implementation of the system-wide ICT strategy developed by the ICT Task Force and endorsed by the HLCM, in particular, the implementation of common software applications.

The Inspectors recommended development of a common payroll system as an initial pilot project of a common application and first step towards a common ERP for the United Nations system as a whole. They noted that some 17 different payroll-processing systems were operational across the United Nations system, developed as part of each organization's management information system. The systems of each organization had evolved independently over the years in an uncoordinated approach, based on different interpretations of common rules and regulations, resulting in a complex set of requirements that, when taken together, unduly complicated payroll administration and modernization.

The Inspectors proposed a phased approach for the implementation of a common payroll system, starting with a reduction in the number of payroll systems, the establishment of "Leader" organizations for each of the vendor groups or other systems (IMIS), and common service entities such as the United Nations International Computing Centre (UNICC) that would offer payroll services on a fee for service or other financial basis to client organizations. The proposal was considered to be technically viable and to yield overall savings of over $100 million over 10 years. The Inspectors further noted that work had already commenced in this regard in the context of the ICT network of the CEB/HLCM, and that some organizations had expressed an interest in using such a common solution for payroll processing. They recommended establishment of a robust inter-organizational governance structure to coordinate and oversee the development and implementation of the common payroll system, stressing the crucial importance of strong leadership to bring the project to a successful conclusion.

ICT governance in the United Nations system organizations (JIU/REP/2011/9)

The Inspectors conducted a comparative analysis of the different ICT governance frameworks, practices and processes in the various United Nations system organizations with a view to identifying best practices and lessons learned, and thereby promote effective ICT governance. Their main findings and conclusions are that an effective ICT governance framework should include the following: (a) a well-functioning ICT governance committee with strong leadership by the executive management; (b) a Chief Information Officer (CIO) or equivalent in a senior-level post with overall responsibilities; (c) a fully developed corporate ICT strategy aligned to the organizations' business needs and priorities; (d) a well-established mechanism to monitor the implementation of the ICT strategy; and (e) robust mechanisms to track ICT costs in the organizations and conduct post-implementation reviews of major ICT investments so as to facilitate strategic decision-making, cost-effectiveness, accountability and transparency.

The Inspectors recommended that the corporate ICT strategies should be presented to the legislative bodies for their information and support, and that in his capacity as Chairman of the CEB, the Secretary-General should streamline the Board's ICT Network by identifying and focusing on common ICT issues and providing clear guidance to the network in order to improve cooperation and coordination among the United Nations system organizations.

Review of ICT hosting services in the United Nations system organizations (JIU/REP/2008/5)

The report provided a comparative study of the main ICT hosting services used by the United Nations system organizations, and identified the best practices which allow cost reductions and improved management of ICT infrastructure and operations. The top factors considered by the United Nations system organisations for seeking external hosting services were: increased cost-effectiveness; increased flexibility in managing resources; lack of internal expertise in the specific business area; difficulties in creating additional staff posts; enhanced network infrastructure; and, more reliable service quality. Conversely, the factors cited by organisations against the use of external hosting services included: the reduced flexibility in managing resources, if hosted externally; reduced cost effectiveness; difficulty in budgeting external service expenditures, inefficient service delivery; unreliable service quality; and legal concerns of losing extraterritorial status by hosting externally which could result in possible loss of data confidentiality.

ICT hosting service's key-benefits are cost-savings, therefore, according to the inspectors, the selection of an appropriate hosting arrangement should be based on a cost-benefit analysis including business needs and criticality of the ICT system/service, and the ICT strategic governance arrangements/decision-making process. In order to facilitate such a cost-benefit analysis of ICT services, the executive heads

of the United Nations system organizations should work with HLCM towards defining a consistent method of recording ICT expenditures/costs. Additionally, the inspectors recommended the United Nations system organizations to explore the possibility of external hosting solutions, particularly the United Nations International Computing Centre (UNICC), in order to take advantage of external hosting with regard to economies of scale, but also to safety considerations since external hosting systems can be placed in an offsite, secure location. UNICC is an inter-organization facility to provide electronic data processing services for the United Nations system organizations and other users.

Offshore service centres in United Nations system organizations (JIU/REP/2009/06)

The Inspectors noted that an increasing numbers of organizations are considering offshoring to reduce the cost of administrative services. The implementation of ERP systems has been the major enabling factor for the offshoring of business processes by the organizations. The Inspectors highlighted that the establishment of offshore service centres is a strategic policy decision with serious implications on the structures of the organizations, and should therefore be subject to the review and approval of the governing bodies. Offshoring policy should be based on the cost-benefit analysis of alternative sourcing options for the delivery of services and developed in alignment with the corporate strategies of the organizations. The policy should consider not only the expected cost reduction and service improvement, but also the risk management imperatives, such as financial, operational and organizational risks. Concerning the achievements/success of offshore service centres, the Inspectors noted that no reports were yet available to analyse and demonstrate the achievement of cost-savings and service quality goals, nor were there any established methodology and monitoring mechanisms to measure progress and to report thereon. In the absence of such monitoring and reporting, the Inspectors noted that the expected achievements of offshoring, namely cost savings and service improvements, remained in question.

The Inspectors concluded the report that the offshoring initiatives of United Nations system organizations had thus far been piecemeal, fragmented and disconnected, and that such an approach failed to capitalize on the potentially greater efficiency gains that might be achieved through inter-agency offshoring initiatives. They recommended that the United Nations System Chief Executives Board for Coordination (CEB), through the High-Level Committee on Management (HLCM), should expedite the consideration of inter-agency shared service centres and initiate the development of a common/joint offshoring policy, with a view to achieving greater efficiency through a joint decision and project development process.

Preparedness of United Nations system organizations for IPSAS (JIU/REP/2010/6)

The Inspector indicated that the transition to IPSAS required a specific gap analysis of all existing (legacy) information systems, with a view to ascertaining whether they could support the production of accrual-based accounts, interface with other systems; and provide effective security.

Most organizations had to update their existing ERP systems or replace their legacy systems (e.g. the Integrated Management Information System (IMIS) used by the United Nations) to achieve an IPSAS-compliant environment, including appropriate support for accrual-based accounting, asset management and field-based operations. For this reason some of the large, decentralized organizations such as WHO, FAO and the United Nations decided to link IPSAS implementation to their ERP projects. The Inspectors pointed out that the linkage of IPSAS projects to the implementation of major new ERP projects involving field and decentralized offices raised the risk of significant delays coupled with uncertain timelines, as their implementation was conditional on funding and project management of ERP projects. The alternative, namely maintaining or upgrading legacy systems might result in only partially IPSAS compliant systems, heavily dependent on manual intervention, increasing thereby the risks of inaccuracy and incompleteness of the data obtained, used for the preparation of financial statements. As of June 2009, 91 per cent of the organizations had conducted evaluations of the changes required to their information systems.

Other challenges were encountered by some organizations with field presence which did not have adequate ERP infrastructure at the field level and would need to process accounting data manually in order to comply with IPSAS. The Inspector also noted the challenges related to the cleaning/quality control of the existing Legacy data, and ensuring that the data being migrated to new ERP system was valid, accurate and correctly formatted.

Accountability frameworks in the United Nations system (JIU/REP/2011/5)

The Inspectors highlighted the need to ensure that the chain of command and delegation of authority are aligned, clear, coherent and integrated into existing enterprise resource planning (ERP) systems. In this regard they noted that WHO had fully integrated its delegation of authority mechanisms into its ERP system.

Review of travel arrangements within the United Nations system (JIU/REP/2010/2)

The Inspectors recommended that executive heads of United Nations system organizations should ensure, where this has not already been done, the exploitation of all available options to revise and upgrade their ERP system travel modules.

Review of the medical service in the United Nations system (JIU/REP/2011/1)

The Inspectors noted that organizations/entities had adopted different programs for electronic filing of medical records, including EarthMed at United Nations headquarters, CHIMED/Préventiel at WHO, and Jasmine Web at UNOG. While indicating that it would seem optimal to adopt one program across the board, they recognized that an organization's choice of electronic records platform should be respected. They stated however, that such platforms should, to the extent possible, enable system-wide compatibility, and also be able to interface with Enterprise Resource Planning (ERP) systems, while ensuring the protection of confidential medical information.

Annex II

ERP and IPSAS implementation status in United Nations system organizations

			Areas handled in ERP					*Implementation timeline*				
Org.	*ERP*	*Hosting*	*Supply chain procurement logistics*	*Finance*	*Human resources*	*Central support services*	*Programme and project management*	*Year planning started*	*Year software purchased*	*Initial go live*	*Upgrade(s)*	*IPSAS*
FAO	Oracle[51]	Internal	•Supplier management •Procurement •Travel (custom-built)	•Cash management and treasury •Financial accounting •Financial budget/ management	•Payroll •Organization management •Position budgeting and control-post management •Time management •Staff development •Recruitment •Performance management	•Implemented a shared services centre (offshore), in 2008, thanks to the ERP	•Programme follows the PRINCE2™ methodology	1995	1996	1999: Oracle Financials 2007: human resources module	Upgraded in 2002, 2005 and 2008. Next upgrade expected November 2012	Expected by end of 2013 with first compliant financial statement for financial year 2014
IAEA	Oracle	ICC	•Supplier management •Procurement of goods and services •Supply shipping, Transportation and storage •Equipment management	•Cash management and treasury •Cost and management accounting •Financial accounting •Financial budget/ management •Fixed asset management	•Payroll •Organization management •Position budgeting and control-post management •Time management	•Conference and event management •Travel management	•Results-based management •Project and programme management •Project accounting •Programme and project budgeting and assessment	Planning started in 2007 for phase I	2009	2011	Have not yet completed the initial implementation of all modules.	2011

[51] Includes Oracle Financials and Oracle E-Business Suite.

Org.	ERP	Hosting	Areas handled in ERP					Implementation timeline				
			Supply chain procurement logistics	*Finance*	*Human resources*	*Central support services*	*Programme and project management*	*Year planning started*	*Year software purchased*	*Initial go live*	*Upgrade(s)*	*IPSAS*
ICAO	Agresso	Internal	•Supplier management •Requisitions, purchase orders and goods •Notes processing through automated workflow	•Cash management and treasury •Cost and management accounting •Financial accounting •Financial budget/ management •Strategic planning	•Payroll •Organization management •Position budgeting and control-post management •Time management •Workforce/ medical and life insurance management •Entitlements management		•Programme and project management	2006	March/ April 2007	2008	Upgrade forthcoming in 2013	2010
ILO	Oracle	Commercial	•Supplier management •Purchasing	•Financial, cost and management accounting •Accounts payable •Accounts receivable •Cash management •Fixed assets	•Organization management •Human resources, administration and contract management •Payroll and payroll accounting •Position budgeting	•Travel management	•Results-based management •Programme, project and grant management	2002	2004	2004	Last upgrade was September 2008 and the next upgrade is scheduled for late 2012 or early 2013	2012
IMO[52]	SAP	Commercial	•Procurement •Material management	•Cost and management accounting •Cash management and treasury •Financial accounting •Financial budget/ management	•Organization management •Payroll •Position budgeting and control-post management •Time management	•Staff and consultant travel processing • Sales billing and dispatch of IMO publications	•Programme and project management	2003	2003	2004	Upgrade to ECC 6 was done in October 2009. Since then, annual and periodic updates have been applied.	January 2010

[52] IMO also uses the following SAP modules, which are not reflected above: B2B and B2C ecommerce transactions, and Business Warehouse — i.e. reporting and analytics on SAP data, including reports on project management, financials and sales and distribution.

			Areas handled in ERP					Implementation timeline				
Org.	*ERP*	*Hosting*	*Supply chain procurement logistics*	*Finance*	*Human resources*	*Central support services*	*Programme and project management*	*Year planning started*	*Year software purchased*	*Initial go live*	*Upgrade(s)*	*IPSAS*
ITU	SAP	Internal	•Procurement (Supplier Relationship Management-SRM) •Inventory management •Equipment management •Sales and distribution	•Cost and management accounting •Cash management and treasury •Financial accounting •Financial budget/ management •Asset accounting •Grants management	•Organization management •Payroll •Position budgeting and control-post management •Time management •Workforce/ medical and life insurance management •Employee/ manager self service	•Travel management		Reimplementation started in June 2009 (1st implementation in 1986)		2 January 2010	ITU re-implemented the SAP system in 2009 with a go-live date of January 2, 2010. For the past 3 years on average 5 new functions were added annually.	2010
UNAIDS[53]	Oracle		•Procurement registrations •Supplier management •Receiving and asset recording	•Accounting •Budget planning	•Contract and payroll records •Staff and career development Staff reclassification and promotion •Positions budgeting	•Travel management	•Monitoring/ reporting	2008				
UNDP	Oracle	UNICC	•Suppliers management •Equipment management	•Cash management and treasury •Financial accounting •Financial/ budget management	•Payroll •Position budgeting and control-post management •Workforce medical and life insurance management	•Project and program management •Travel management		2002		2004		2012

[53] UNAIDS uses the WHO GSM.

Org.	ERP	Hosting	Areas handled in ERP: Supply chain procurement logistics	Finance	Human resources	Central support services	Programme and project management	Implementation timeline: Year planning started	Year software purchased	Initial go live	Upgrade(s)	IPSAS
UNESCO	SAP	Internal	•Suppliers management •Equipment management	•Cash management and treasury •Cost and management accounting •Financial accounting •Financial/ budget management	•Organization management •Payroll •Position budgeting and control-post management	•Travel management •Program and project management		2000	2000	2002	Regularly since 2002	2010
UNFPA	Oracle	UNICC	•Supplies management •Equipment management •Inventory management	•Cash management and treasury •Cost and management accounting •Financial accounting •Financial/ budget management	•Payroll •Position budgeting and control-post management •Absence management	•Program and project management •Travel management						2012
UNHCR	Oracle	ICC	•Demand planning and management •Supplier management •Supply shipping, transportation and storage •Equipment management	•Cost and management accounting •Cash management and treasury •Financial accounting •Financial budget/ management •Strategic planning	•Organization management •Payroll •Position budgeting and control-post management •Workforce/ medical and life insurance management •Performance management •Recruitment and talent management •Staff welfare	•Travel management	•Project and programme management	1998	1999, then put on hold until late 2002	2004		2012

			Areas handled in ERP					Implementation timeline				
Org.	*ERP*	*Hosting*	*Supply chain procurement logistics*	*Finance*	*Human resources*	*Central support services*	*Programme and project management*	*Year planning started*	*Year software purchased*	*Initial go live*	*Upgrade(s)*	*IPSAS*
UNICEF	SAP	Commercial	•Supplier management •Supply shipping, transportation and storage •Equipment management	•Cost and management accounting •Cash management and treasury •Financial accounting •Financial budget/ management •Strategic planning	•Organization management •Payroll •Position budgeting and control-post management •Time management •Workforce/ medical and life insurance management	•Documents management •Service management •Travel management	•Project and programme management	1997 2008	1998 2009	1999 at HQ. The ERP was deployed globally on 2 January 2012.	VISION ERP system just rolled out globally as of 2 January 2012, so no further planned upgrade as yet.	2012
UNIDO	SAP	Internal	•Supplier relationship management •Material management including inventory and assets management	•Cost and management accounting •Cash management and treasury •Financial accounting •Financial budget/ management •Strategic planning •Grants management, funds management including post-cost planning	•Organization management •Payroll •Position budgeting and control-post management •Travel management •Time and leave management/ESS and MSS/personal administration/ performance management, including 360 degree performance appraisal/ e-recruitment.	•Conference and event management, including learning solutions. •Documents management •Knowledge management and collaboration, including C-Rooms	•Portfolio and project management/ project systems	January 2010	December 2010	January 2012	SAP ECC 6.05 was installed in 2011 and, due to the ongoing implementation and development, it has not been upgraded at this stage	2010

Org.	ERP	Hosting	Areas handled in ERP: Supply chain procurement logistics	Finance	Human resources	Central support services	Programme and project management	Implementation timeline: Year planning started	Year software purchased	Initial go live	Upgrade(s)	IPSAS
UNOPS[54]	Oracle	ICC	•Supplier management •Equipment management	•Cost and management accounting •Financial accounting •Financial budget/ management	•Organization management •Position budgeting and control-post management •Workforce management			2003		2004		2012
UN-Women[55]	Oracle	ICC										
UPU	Oracle	Internal						2010	2010	2011		2011
WFP	SAP	ICC	•Material management •Supply shipping, transportation and storage •Pilot of the logistics module in Liberia and Sierra Leone	•Cost and management accounting •Cash management and treasury •Financial accounting •Asset accounting •Fund management •Grant management	•Organization management •Payroll •Position budgeting and control-post management •Workforce/ medical and life insurance management •Personnel administration and time management	•Travel management	•Project and programme management	1999: WINGS I 2006: WINGS II	1999: WINGS I 2009: WINGS II	2001: WINGS I 2009: WINGS II	Upgraded August 2012	2008

[54] UNOPS uses UNDP Atlas.

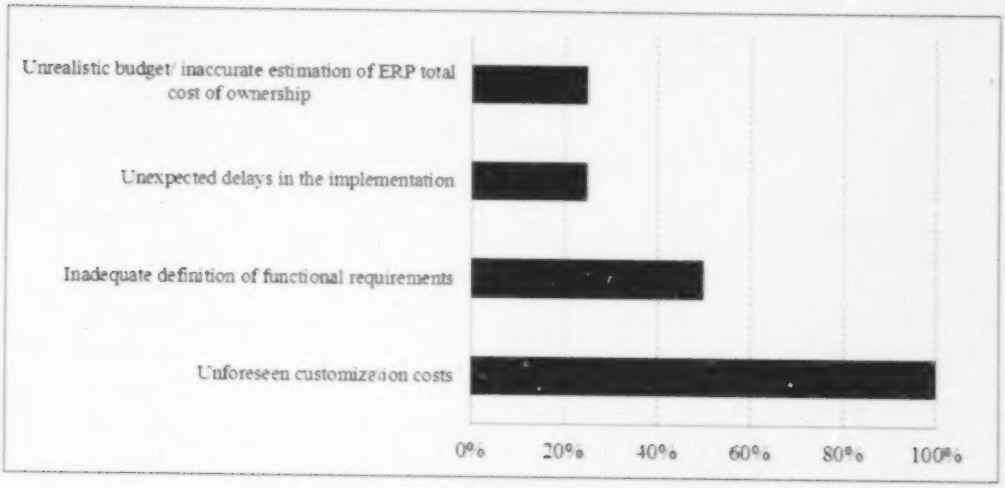
[55] UN-Women uses UNDP Atlas.

			Areas handled in ERP					Implementation timeline				
Org	*ERP*	*Hosting*	*Supply chain procurement logistics*	*Finance*	*Human resources*	*Central support services*	*Programme and project management*	*Year planning started*	*Year software purchased*	*Initial go live*	*Upgrade(s)*	*IPSAS*
WHO	Oracle	ICC	•Procurement registrations •Supplier management •Receiving and assets recording	•Cost and management accounting •Cash management and treasury •Financial accounting •Financial budget/ management	•Organization management •Payroll •Position budgeting and control-post management	•Meeting and event management •Travel management	•Project and programme management •Strategic planning	2004	2004	2008	A technical upgrade project is about to be launched, and is expected to be complete in mid-2013.	2012
WIPO	Oracle	ICC	•Supplier management •Supply shipping, transportation and storage •Equipment management	•Financial accounting •Financial budget/ management	•Human resources and global payroll module, position budgeting and management planned for 2013		•Enterprise performance management/ Hyperion Planning in 2013	2002	2003	2004	Upgraded to version 8.9 in 2007. Upgraded to version 9.1 in April 2012 (about to go live).	2010
WMO	Oracle	ICC	•Supplier management •Purchasing	•Cash management and treasury •Financial accounting •Financial budget/ management	•Organization management •Payroll •Position budgeting and control-post management	•Travel management	N/A	2005	2005		Upgraded from R11 to R12.1.3 in November 2011.	2010

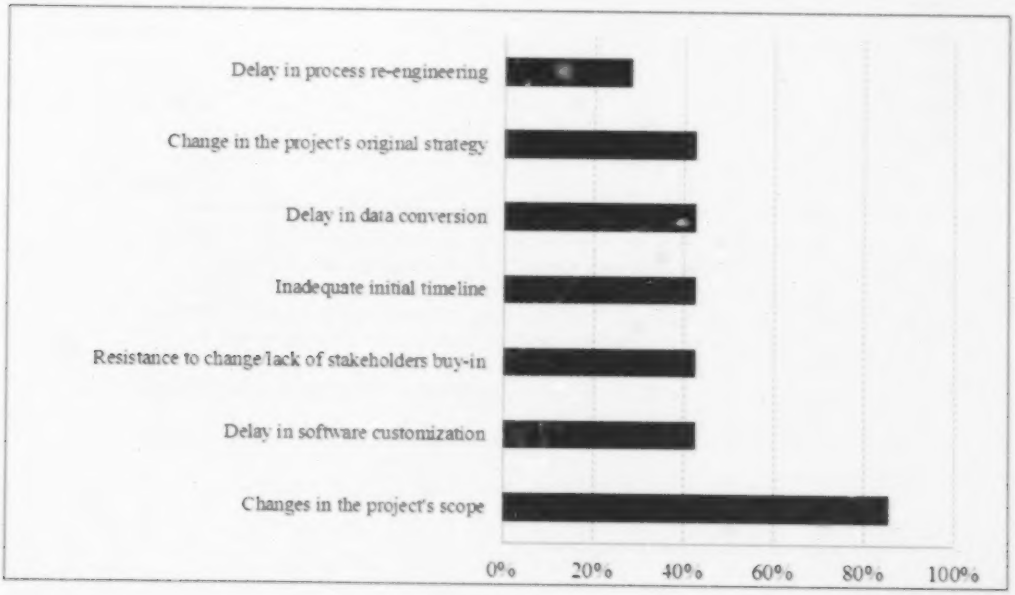
Annex III

Main reasons why ERP systems were implemented over budget and over schedule in United Nations organizations

a. Main reasons why ERP systems were implemented over budget in United Nations organizations



b. Main reasons why ERP systems were implemented over schedule in United Nations organizations



Annex IV

ERP implementation and maintenance costs

a. ERP implementation costs reported by United Nations organizations (in USD)

Organization	*Costs in USD*
FAO	86 200 000[1]
IAEA	27 979 717*[2]
ICAO	7 100 000
ILO	40 000 000
IMO	3 650 937**
ITU	4 000 000[3]
United Nations	315 800 000
UNAIDS[4]	
UNDP	67 800 000
UNESCO	20 000 000
UNFPA[4,5]	8 900 000
UNHCR	73 000 000
UNICEF	47 000 000[2]
UNIDO	12 007 962*[2]
UNOPS[4]	
UN-Women[4]	
UPU	1 299 735***
WFP	54 800 000[2]
WHO	59 600 000
WIPO	13 500 000***
WMO	1 515 608***
Total	**796 453 959**

* Original currency EUR (used average United Nations exchange rate: 0.756733333).
** Original currency GBP (used average United Nations exchange rate: 0.632).
*** Original currency CHF (used average United Nations exchange rate: 0.915071429).
[1] Reflects total ERP implementation cost including: implementation release (1998) — $28 million; implementation of HRMS modules (2007) — $19.7 million; and implementation of GRMS (2013) — $38.5 million.
[2] This is an estimate from the feasibility study conducted in 2006. As the programme is still ongoing, these are not final costs.
[3] These costs only relate to the second ERP implementation, and do not include the first implementation.
[4] Organizations that share their ERP with UNDP or WHO and paid a share of the implementation costs.
[5] UNFPA also incurred customization costs.

b. ERP annual recurring maintenance costs (in USD)

Organization	*Licence maintenance costs*	*Hosting costs*	*Support staff costs*	*Technical consultants and experts cost*	*Other ERP maintenance recurring costs*	*Grand Total*
FAO	749 000	383 000	2 625 000	0	49 000	3 806 500
IAEA[1]	335 061	1 453 914	1 309 946	1 810 307		4 909 228*
ICAO			550 000			550 000
IMO	60 127[2]	204 114[3]	1 034 810[4]	130 142[5]		1 499 208**
UNAIDS[6]						
UNDP	2 794 027	4 497 460	6 284 006	1 772 976	2 000 000[3]	17 348 469
UNESCO	320 000	650 000	1 800 000	90 000	140 000	3 000 000
UNFPA[6]	516 000	544 000	1 142 000	500 000	770 000	3 472 000
UNHCR	838 667	1 720 341	5 279 814	981 819		8 820 641
UNICEF	1 993 311	2 156 652				4 149 963
UNIDO	471 236	294 702				765 938*
UNOPS[6]		2 500 000	450 000			2 950 000*
UN-Women[6]						
WFP	1 382 321	2 634 195	1 160 120	1 500 000	585 000	7 261 636
WHO	800 000	2 500 000	2 500 000	2 100 000		7 900 000
WMO	157 700	412 800	772 500			1 343 000
Total	**10 487 465**	**19 951 178**	**24 908 196**	**15 864 608**	**3 544 000**	**67 776 083**

* Original currency EUR (used average United Nations exchange rate: 0.756733333).

** Original currency GBP (used average United Nations exchange rate: 0.632).

[1] These costs include a certain portion earmarked for enhancements and changes to the system, which may or may not be undertaken, and is subject to the availability of funding.

[2] These include the licence and maintenance costs for SAP and other add-on tools used with SAP.

[3] This is an annual amortized cost over a 4-year period consisting of costs incurred for SAP upgrade, hardware and licence costs, outsource transition and hosting costs. Due to cost bundling, the hosting cost element cannot be identified in a straightforward manner.

[4] These include outsourcing costs for user support, application support and maintenance, and in-house SAP support team costs.

[5] Average annual spending for SAP system enhancement and development.

[6] Organizations that share the UNDP or WHO ERP. The organization pays a recurring maintenance fee.

Notes: ICAO indicated annual licence costs to be included in maintenance costs, but maintenance costs are not indicated in the table; the WMO indicated salary of staff at standard costs in CHF. Staff costs reflected in the table include average salaries without dependants.
WHO indicated that the maintenance costs provided in the table are the "direct costs" of supporting the ERP system. They do not include related costs (such as the help desk and the Global Service Centre, which carry out services that go beyond the ERP, nor the costs of associated and integrated systems such as records management). They do not include indirect costs (such as business and senior management time and training). Although they do include an element of system enhancement costs, they do not include major project work (WHO is currently undertaking an upgrade project). The licence maintenance costs include all Oracle licences together with all ERP-associated tools. The annual hosting costs are the direct costs associated with the external hosting of the ERP system. They do not include common costs (such as common infrastructure costs). The annual support staff costs are the direct costs of staff working on ERP support. They do not include staff working in the help desk or in the Global Service Centre. They do not include the indirect costs of business and staff training.

Annex V

Main findings from user focus groups conducted during the review

Theme	*Recurring issues raised by users*	*Sample examples given during the discussions*
Questions 1 & 2. To what extent has the ERP improved your access to accurate and timely information and data? To what extent does ERP enhance/facilitate your work?		
Improved access to information and data	The system makes the consolidation of data and reporting easier	- Prior to the ERP, the organization had different systems running at headquarters and in country offices. It was difficult to get data. Now at least all the data is in one place.
	The system enables timely access to information	- With the old system it was a nightmare to extract reports. ERP made reporting much easier. - Before data was updated once a month. Now one can see updated information immediately.
	Improved access to data and information supports improved decision-making	- ERP has improved inventory and warehouse information. Before you did not know what happened in the field in terms of purchase because every country had a standalone system. Now it is easier to get the big picture. - With online instant information, it is even possible to do budget projection. - The system provides performance indicators to management, and one knows what is behind the data - Before the ERP, country offices did not have an integrated system. Now project managers can be more self-sufficient if they are trained properly.
	Improved access to data and information supports enhanced efficiency	- The system enhanced operations in supply chain management. - Payments are made in a timelier manner. - Travel has improved. - Consolidation of data in one system saves time
	Integrated data and information enables organizations' decentralization	- The system enabled the decentralization of human resources responsibilities. - With a single integrated system, you can see data worldwide even if the organization is decentralized
Reporting and query issues	Reporting is still weak	- Reporting is very limited. Users are forced to download raw data, and create reports manually.
	Reports are hard to understand	- In the ERP, one cannot find a report that gives a description of the information displayed. One needs to check the description of the codes provided.
	Reports and query results are inaccurate because of inaccurate or incomplete data in the system	- Regarding human resources, the grades of certain types of contracts are not reflected in the system. As a result, there are inconsistencies in the data you get if you run queries. If you run a report on human resources, you have to export it to Excel, and fix it manually during two hours. - Query results on donor contributions are only showing 55% of the contributions because data has not been updated. We have to use Excel in parallel because data in the system is not accurate. - There is no standard naming convention. This leads to incomplete query results.
	There are reporting problems because people don't know how to generate reports in the system	- Reports do not match because the way information is defined in each report differs. - People do not know how to generate reports. They compile reports from different period of time. - Everyone makes his own report with different figures. Some people use last year's queries to get the information from this year.

Theme	*Recurring issues raised by users*	*Sample examples given during the discussions*
	There are reporting and query problems because the system has been too customized	- The human resources module is so heavily customized that it cannot use the ERP's analytics functionalities. It has to use third party analytics.
		- The ERP has about three thousand query reports, but half of them are not relevant. Each year, headquarters develops new queries instead of creating standard queries that can be used every year. As a result a lot of queries are obsolete. It takes a lot of time to try them all.
	There are problems with data consolidation due to issues with systems integration	- The interface between the ERP and the budgeting legacy system is not good because the systems do not speak the same language. The legacy system provides the data entry module, and data is then exported and imported into the ERP's budgeting module, but neither can give a full report. It is impossible to print full report of total budget or total expenditure by objective
	The system does not facilitate decision-making due to data inaccuracy issues	- If data in the system is not updated, the cash flow forecast functionality becomes useless.

Q.3. How easy to use and navigate is the system?

Usability of the system	The system is not user-friendly and the navigation is not intuitive	- The system's navigation is not user friendly. The back option from browser is not always there.
		- You may need to do six clicks before getting to the place where you are supposed to work.
		- You need to do a four hours training to know how to use the self-service features in the system.
		- More resources should be spent on improving the usability of the system.
	Users need daily practice on the system not to forget how to use it	- Users need to have training and practice. If you do not practice on a daily basis, you will forget everything.
	It is difficult to identify and correct mistakes in the system	- If you save a purchase order with the wrong currency, then it is difficult to modify. You have to delete and reissue the whole purchase order. The system does not let you go back 1 step to correct a mistake.
		- You cannot really see mistakes until you make reports.
		- Unless you have correction permissions, to change something you need to undo all the actions until the action that needs to be changed.
	The ease of use of the system depends on the capacities and training of users	- You need training to be able to use the system.
		- If you know the shortcuts, the system is much easier to use. But this requires training.
		- The paradigm of user satisfaction depends on users' respective capacity.
	The language of the system can be a problem for non-English speakers	- The fact that the system and training materials are only in English can be problematic.
	Some customizations were implemented to make the system more user-friendly	- The human resources module requires some customizations to reflect the UN rules and regulations.
		- Some hyperlinks were removed to simplify the navigation. Today it may not be necessary due to users' learning curve.
	Some customizations made the system harder to use	- The organization segmented the budget too much. It led to a huge amount of data, which creates problems with the system at peak times.
		- There are too many narratives in reports. Project planning is so vast that no one has the patience to fill out all the data.
		- A lot of things that people find hard to use in the system come from customizations.

Theme	*Recurring issues raised by users*	*Sample examples given during the discussions*
Accessibility of the system	The system is very slow and time-consuming	- The system is slow at headquarters and in the field, even if it is slower in the field. The slowness of the system is also due to the programming in the system. The speed decreases when all the offices are using the system at the same time. In Chad and Côte d'Ivoire, we had to wait 20-30 minutes to generate a report, and sometimes it did not work.
		- The system is so slow that it cannot be used for e-tendering.
		If you do not click on hold, if there is a power cut, you lose everything. The system does not save your work automatically.
		- When the system times out or freezes, you have to start the workflow again from the beginning.
	The system is not supported by all browsers	- The system is only compatible with internet explorer (IE).

Q.4. How sufficient is the training and user support provided to you?

Classroom training	ERP training is limited due to lack of time and/or lack of funds	- Due to tight timeline for the launch of the system, user testing and training was very condensed.
		- The system was rolled out under time pressure, so training was too rushed. In three days, you were supposed to cover the whole system, and after we only had some general refresher in a few days.
		- When the system was launched, staff from regional offices went to headquarters for the training of trainers. But then training did not occur in all country offices; for e.g. it did not happen in Kenya.
		- The support unit provides user support, and in theory it should also provide training. But due to funding problems, it only provides e-learning materials (UPKs).
		- There are training courses available at headquarters. But they leave it up to each country office to find money for training. Even if a user wants to go on training, the country office may say no.
		- We do not have time to train new staff, so when there are new staffs, we get a consultant to do the training. But not all country offices can pay for training.
	The right audience does not necessarily attend classroom training	- Now managers need to use ERP a lot more than legacy systems, but they do not register for training. They send G staff also for matters that concern them. G staff is also attending on behalf of P staff. There is a need for cultural change.
	The lack of on-going training is a problem when new staff joins the organization or when there is staff turnover	- There are training problems when new staff members arrive.
		-Peers do training when new people come, so staff turnover can be a problem
		-There are on-going training issues. When people leave, some country offices are left with people who do not know the basics of the system.
	Lack of user training increases risks of errors in the system	- New staffs should be trained before they have access to the system because when you are new you can make more mistakes
		- You can only practice with what is in the e-guide which is limited. You cannot really practice mistakes on the training module, so you have higher risks of making mistakes in the ERP system.
	Awareness training about business processes would be required before training on the system	- Ideally you should learn first about the business processes, and then about how it translates into ERP.
	Practical training tailored to specific business needs is required	- Every section has different needs. Certain elements, such as reports, would need additional training.
		- You need separate human resources training for human resources staff.
		- On the finance side, some training is done on how to make queries.

Theme	*Recurring issues raised by users*	*Sample examples given during the discussions*
E-learning	E-learning alone is not sufficient	- You are expected to do learn by yourself with e-training. But if you need to do more advanced things, you need more technical support.
	E-learning material can be difficult to access in low-bandwidth environments	- It is difficult to use UPKs and they may be difficult to access with a slow internet connection.
	People may lack time and/or initiative to go through e-learning materials	- If you click on help, it takes you to a list of 500 UPKs, but people don't have time to go through them. - The organization tried to create some guides based on common issues, but people don't look at them. - A lot of training modules are already available but people need to take the initiative to look at them.
	E-learning materials should be updated	- E-learning materials are not really updated.
Communication	Communication with users about changes made to the system should be improved	- There is a lack of communication between headquarters and the field. Headquarters change codes of years for queries, but does not inform the field. There should be automatic pop-ups to notify users about changes made in the system.
	Some attempts to improve communication were hindered by lack of initiative from staff	- Some people do not read communications about new changes. - There was an attempt in the past to put a discussion group on the intranet so that users could share issues, but it was not widely used. Sometimes people organized kiosks to discuss problems.
User support	Getting support from the service desk to resolve an issue takes a lot of time and you may never receive an answer	- We rely on the global helpdesk to get problems solved, but it can take up to 3-4 days to get a solution. It would be much more helpful if problems were documented. - If you cannot solve a problem, you can send a ticket to a local expert, and if he cannot solve it, the issue is sent to another level. This takes time. -E-ticketing enables issue tracking but it creates delays in problem resolution. - If we use the service desk, we do not get any answer, except for an automatic ticket notification. We rely on our own MIS group.
	Ticketing improved communication with users	- The ticketing system allows users to log and track tickets. It improved communications between users and the support unit.

Q.5. To what extent was users' feedback taken into account during the design, implementation and post-implementation stages of the ERP project?

Feedback	Feedback was taken into account at the design stage	- At the design phase users from each business area were represented.
	Feedback was taken into account at the ERP implementation stage	- Users' feedback was taken into account during the ERP implementation. In each department, there was one person dedicated 100% to the project.
	Feedback received has to be prioritized	- People do not really know what to expect from ERP; so it is not easy to ask feedback. Then the question is how you prioritize it. - At the beginning of the implementation, the implementation team put everything that users wanted and it was too complicated. Now they are trying to make it simpler and easier to use.
	Feedback was not monitored at the post-implementation stage	- Users feedback was not taken at the post implementation stage - The field did not talk with headquarters about the problems they are having with the system.

Theme	*Recurring issues raised by users*	*Sample examples given during the discussions*
Q.6. To what extent has the system improved your organization's governance and internal controls?		
Internal controls improved	The system enhanced budget and finance controls	- ERP incorporates internal controls such as budgetary and funds sufficiency controls. - The system enables users to see income, budget and expenditures live.
	Internal controls are enhanced through user profile and role management	- If you need permissions outside of your standard profile, you need to make a separate request and to justify why you need those permissions. - If you want to cancel a workflow, you need to cancel each step, which involves different people. - No transaction can be completed in the field. They can be started there, but they have to be completed at headquarters. - Delegation of authority was introduced so that the person can only access information related to his business unit. - The name of the person who inserted data in the system is automatically generated from the user's login. The system keeps the history of changes made by users. - Users only have access to the queries they need.
Issues with governance and internal controls	But the system reduces flexibility	- The system is less flexible. For e.g. you cannot get paid if the system says you have no money. The system keeps the limitations given by donors. For example, you cannot use contributions that expired.
	Resistance to change impinged on improved governance and controls	- In many offices, including HQ, paper-based workflows were introduced in parallel to electronic ones, despite the fact that when the system was implemented, unnecessary paper-based workflows had been removed. Managers delegate their electronic approval authority or give their passwords to administrative assistants. Things can be approved in ERP without being carefully looked at. - In the ERP you do not have a good control for leave management because some managers let leave requests open.
	Some processes lack internal controls	- Different locations are able to connect and change buyers for purchase orders. You can change the supplier for a payment that has already been done. As people learn how to use the system, they know more tricks. The system needs to be audited regularly. - When creating a new vendor you need to go through a paper-based terrorist list, which brings risks of errors. It would be better to have that list in the system. - Human resources modules require more controls. You can start an action from the beginning to the end without anyone checking it. This brings a high potential for fraud as you can even pay a person.
	In some cases there may be too much control	- In human resources, national staff cannot see information about international staff. But in country offices, the head of the office is a national staff.

Theme	*Recurring issues raised by users*	*Sample examples given during the discussions*
Q.7. Overall to what extent does the system fulfil your needs, and which changes would you recommend for improving it?		
Changes needed to improve the system	Issues already identified should be addressed	- Local experts from each region share common problems with headquarters. - The list of changes required, such as shipment tracking, is already available, but these changes were never implemented. - Headquarters have more than enough information on problems with the system. They should look at the information, and do something to improve the system.
	The system should be adapted to changing requirements	- Requirements have changed over time. - We should look at business processes and policies again. If the system has to accommodate the current human resources policies, there will be the same customization issues.
	The usability of the system needs to be improved	- Regarding human resources, more customizations are needed to make the system fit better the organization's rules and regulations, unless rules and regulations are changed to fit the system. - Usability issues are still to be addressed.
	Enhance internal controls and accountability	- Changes to the system should strengthen accountability

Annex VI

Overview of actions to be taken by participating organizations on the recommendations of the Joint Inspection Unit

JIU/REP/2012/8

		Intended impact	United Nations, its funds and programmes														Specialized agencies and IAEA													
			CEB	United Nations*	UNCTAD	UNODC	UNEP	UN-Habitat	UNHCR	UNRWA	UNDP	UNFPA	UNICEF	WFP	UN-Women	UNOPS	ILO	FAO	UNESCO	ICAO	WHO	UPU	ITU	UNAIDS	WMO	IMO	WIPO	UNIDO	UNWTO	IAEA
Report	For action		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒
	For information		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐
Recommendation 1		e		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		E
Recommendation 2		e		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L		L
Recommendation 3		e		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		E
Recommendation 4		g	E																											

Legend: L: Recommendation for decision by legislative organ **E:** Recommendation for action by executive head

■ : Recommendation does not require action by this organization

Intended impact: a: enhanced accountability **b:** dissemination of best practices **c:** enhanced coordination and cooperation **d:** enhanced controls and compliance **e:** enhanced effectiveness **f:** significant financial savings **g:** enhanced efficiency **o:** other.

* Covers all entities listed in ST/SGB/2002/11 other than UNCTAD, UNODC, UNEP, UN-Habitat, UNHCR, UNRWA.